The Economic Impact of Ontario's Universities

A Report Prepared By

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The Economic Impact of Ontario's Universities

Executive Summary:

This study estimates the impacts of the university sector on the Ontario economy for five components: expenditures by institutions and out-of-province students, innovation benefits due to formation of spin-off companies and other research and development-derived consulting activity, additional earnings of university degree holders, and cost avoidance due to additional philanthropic giving and volunteer contributions by university graduates. The estimates are summarized in Table ES-One and additional descriptive detail is given in a chapter associated with each of the components listed. Further information is contained in the appendices.

Using 1998 as the reference year, the Province of Ontario annually invests just over $2.1 billion in university education in the form of grants to universities and aid to students. Associated inflows to the provincial treasury, including savings due to cost avoidance, in a one-year period from the five components mentioned are at least $1.2 billion. Recognizing that the Province has made investments in universities in prior years, estimates have been derived for the portion of the payback from those investments that flows to the *provincial* treasury in a single year (1998). The net result is that, for a single year (1998), it is possible to identify roughly $3.2 billion in revenue flows to the province that are linked to the university sector.

Like its provincial counterpart, the federal government receives substantial inflows to the national treasury as a result of both the operations of Ontario universities and the economic effects of the institutions as well as their graduates. Taken together, these impacts are estimated to have been as much as $6.75 billion in 1998[1]. Roughly 30 per cent of these revenues are derived from the taxes (mostly income) received as a result of salary and wage expenditures on Ontario university campuses and those businesses most closely associated with them. The remaining portion comes mainly from income taxes and goods and services tax payments on the incremental expenditures of *all* holders of university degrees ($4.75 billion). If we consider only a *one-year* cohort of university degree holders, we note that compared to the $367 million invested directly by the federal government in universities in 1998, the tax revenues (income tax and GST) received for that same year from incremental tax payments to the federal treasury are estimated to be at least $308 million.

[1] This estimate combines the approximately $2.0 billion in taxes accruing to the federal government due to the expenditures of universities and the related indirect impact of these expenditures as well as $4.75 billion in income tax and GST revenues from incremental earnings of university graduates.

In terms of job creation, the university sector is a substantial contributor, accounting for well over a third of a million Ontario jobs on either a direct or indirect basis. A summary of the contributions of each component to the job creation estimate is provided in Table ES-Two. Fewer than a quarter of these jobs are found at the universities themselves. Most of the job creation from the investment in universities is spurred by the expenditures of faculty and staff, institutional spending on materials and goods required to deliver university services, students from outside Ontario who come here for their education, the economic development that takes place due to (off-campus) spin-off companies and consulting activity flowing from university-based research and development, and the *additional* earnings (and therefore expenditures) of university graduates.

Considered as an "industry", the university sector is a significant employer. There are more people employed *directly* by Ontario universities (faculty and staff) than any of the Canadian biotechnology sector, the national advanced manufacturing sector, or the country's aerospace industry[2]. Like the other sectors named, the university sector offers—and often creates—high-paying jobs. It is, in fact, part of the knowledge-based economy.

Although it is not yet possible to estimate with any degree of precision the private sector investment monies that are triggered by the output of universities—either through faculty or graduating students—there are certainly signs that this relationship exists. Licensing of innovations that have emerged from university-based research and development are known to trigger significant pre-production expenditures along with the expenditures associated with ongoing business activity. Technology-intensive companies are known to congregate near universities with significant research and development activity. Findings from university-based research are known to have triggered partnerships with, and substantial capital investments by, private sector firms.

Using 1998 as the reference year, Ontario's universities spent approximately $4.7 billion that generated over $10.1 billion in total economic activity (GDP). It is also possible to estimate the economic value of university expenditures to a community that is home to such an institution. The impact on the local economy and the revenues for local governments for each of Ontario's universities is included as an appendix to this report (See Appendix A: Table A-A Three Part One and Part Two). However, these estimates are incomplete in that they do not assign any value to the capital infrastructure (libraries, sports facilities, art galleries) that universities provide. In some cases, the availability of this infrastructure makes it possible for local governments to avoid having to finance significant capital projects of their own to provide these facilities to their citizens. This issue, along with further investigation of the relationship between university-based research and the economic development resulting from knowledge and innovations flowing from this research, are worthy candidates for researchers' attention in the years ahead.

[2] For example, 1997 Industry Canada data indicates that the Canadian biotechnology industry employed 11,000 people directly; advanced manufacturing employed 17,600 people directly; the aerospace industry employed 84,000 people directly. The number of people employed directly by Ontario universities is also greater than Ontario's forestry and mining industries combined (1998).

Table ES-One: A Summary of Annual Economic Impacts (1998)

Component *	Outflow from Provincial Treasury/Investment (in millions)	Inflow to Provincial Treasury/Pay-back (in millions)
Provincial Transfers to Ontario Universities	$1,914	
Provincial Support to Student Aid	$ 225	
Provincial Tax Revenues (Income and Sales) From Institutional Expenditures		$ 771.4
Provincial Sales Tax from Out-of-Province Students		$ 13.5
Provincial Income Taxes-Innovation Provincial Sales Taxes-Innovation		$ 10.4 $ 28.4
Provincial Share of Income Taxes due to Incremental Earnings of One-Year Cohort of University Degree Holders (Education Premium)		$ 104.0
Provincial Sales Tax Revenue due to Incremental Earnings of One-Year Cohort of University Degree Holders (Education Premium)		** $ 34.1
Cost Avoidance *** due to Incremental Philanthropic Giving of University Graduates (Philanthropic Premium)		$ 210.0
Cost Avoidance due to Incremental Volunteerism (Volunteerism Premium)		$ 73.0
Total Annual Investment Vs. In-Year Pay-back	**$2,139**	**$1,244.8**
Single Year Pay-back of Incremental Provincial Income Tax By All University Degree Holders*		$1,719.6
Single Year Pay-back of Incremental Provincial Sales Tax By All University Degree Holders*		$ 381.9
Total Inflows in 1998 Associated With University Sector	**$2,139**	**$ 3,208.2**

* Unless otherwise noted, the inflow data presented in this chart includes direct and indirect (ripple) effects as expenditures move through the economy.

**Note that on an annual basis, we estimate that the Province of Ontario receives $1.7 billion in *incremental* provincial income tax revenue and $ 381.9 million in provincial sales tax revenue from the spending of all university graduates in Ontario. This means that on an annual basis, the revenues coming in to provincial coffers due (directly or indirectly) to the Government of Ontario's investment in universities may be as high as $3.2 billion. In presenting this summary figure, the one-year cohort Education Premiums for both income tax and PST have been removed to avoid double-counting in the figures for all university graduates.

*** Direct estimate only

Table ES-Two: Job Creation Summary

Component	Direct	Indirect	Total
Institutional Expenditures	104,535	91,991	196,526
Out-Of-Province Students	4,407	4,414	8,821
Innovation Premium	1,342	1,077	2,419
Incremental Expenditures – Ontario university degree holders (1998 impact of a single year cohort)	7,592	3,796	11,389
Total "Single Year" Job Creation	117,876	101,279	**219,155**
Incremental Earnings - Ontario university degree holders (1998 impact of all years)	112,950	56,475	169,425
Total Job Creation in 1998 Associated with University Sector*	223,234	153,790	**377,191**

* To prevent double-counting, the job creation associated with incremental earnings of university graduates (single year cohort) has been deducted from this total before adding in job creation associated with incremental earnings (all Ontario degree holders).

Introduction:

Every year, governments, businesses, individuals and public sector agencies invest more than five billion dollars in Ontario's university system. Most of this investment flows directly to the province's 18 institutions[3] with the balance going to students in the form of scholarships and student aid. As with any other type of investment, those charged with investment decision-making responsibility ask a simple question: *what is the impact of making this investment*?

This question is typically answered through an economic impact study, of which there are many different types, each suited to a particular purpose and each with its own strengths and weaknesses. This economic impact study draws together the results of a series of analyses, each of which tackles a different aspect of impact assessment. The overall objective of this study is to offer a broad view of as many impacts of an investment in Ontario universities as are considered to exist, including quantitative estimates where those calculations are possible. In addition to being as comprehensive as possible, this study is also based on several other underlying principles:

- While the effects of (or pay-back on) investments by all stakeholders are important, the focus of this study is on the pay-back on investments by *the Province of Ontario*, in its role as decision-maker on behalf of the citizens of the province.
- Although investment in universities —like any other investment—could have repercussions on the social development of Ontario society, the focus of this study is on *economic impacts*.
- As compared to economic impact studies carried out for a single institution or enterprise, this study examines a group of investments that are made in individual institutions (universities). In this sense, the study can be considered *"system-wide"*.
- The emphasis of this study is on *comparative* impact, that is, the degree to which investing in Ontario universities brings greater, lesser or about the same impact as would be the case if those same funds were invested elsewhere in the economy.
- In preparing this report, we have emphasized *simplicity* in analysis. Each component of the study considers the findings of earlier works in that particular field.[4] Without bringing unnecessary complexity to the analysis, we have applied the most significant of these findings to the assessment presented in this report.
- Because it is the most recent year for which the most complete set of data is available, we have used *1998 as our reference year*. This decision means that some recent policy decisions, such as the creation of the SuperBuild Fund, have not been taken into account in this analysis.

[3] 17 universities and the Ontario College of Art & Design

[4] Enterprise Canada Research has also provided the Council of Ontario Universities with a literature review summarizing the state of knowledge and analytical thinking in each of the areas described in this report. The findings of this work have been applied in carrying out the economic impact analysis.

Components of the Study:

This economic impact study has five major components:

1. The impact of the expenditures made directly through Ontario's universities, including contribution to economic growth and job creation.
2. The impact of out-of-province students through their personal expenditures.
3. The impact of universities on innovation through off-campus development of research and development intensive business activity
4. The impact of university graduates on the Ontario tax base as a result of (on average) higher earnings.
5. The impact of university graduates on financial and volunteer resources available to charitable organizations.

Even a cursory glance at this list would suggest that many possible economic impacts of universities are not included in this analysis. We have not included a quantitative assessment of the economic impact of expenditures by out-of-province visitors to a university campus. There is no estimate of the economic value of a university's contribution to a host community, public agencies or to governments at any level through the voluntary expertise contributed by faculty and staff. We have not calculated the economic value (examples: tax revenues, employment, operating expenditures and capital investment in the provincial economy) of corporate enterprises created and/or managed by university graduates. In each of the omitted areas, there simply is neither sufficient nor data or rules of thumb for even order-of-magnitude estimates of economic impact. As a result, we believe it is reasonable to consider the economic impacts associated with an investment in university education in this report as being conservative. In other words, if it were possible to take all components into account, the consolidated economic impact values might well be higher.

The Institutional Premium:
The Impact of Expenditures by Ontario Universities

Study after study of the economic impact of universities indicates that, in most ways, the power of a dollar expended through public investment in a university has many of the same impacts as a dollar expended in any other economic transaction. Some of the expenditure is devoted to salaries and wages, some is used to acquire goods and services within the host jurisdiction. Jobs are created. Tax revenues are generated. As a result, it is quite legitimate to refer to the effects of institutional expenditures on the provincial economy (direct and indirect economic activity triggered by an institution's expenditures; job creation on and off campus, taxes accruing to all levels of government). However, the core question remains: is the economic payoff to the investor (in this case, the Province of Ontario) better, worse or about the same as would be generated by any other use of these funds?[5]

Relatively few system-wide economic impact studies have been carried out in North America[6] and only one—the Kubursi/Econometrics Research Ltd. study of 1992—has been carried out to assess the economic impact of Ontario's university system as well as each of the institutions within the system. The Kubursi study generated multipliers for several measures of economic activity as well as job creation. These are discussed in more detail in the following section. However, what appears to have gone relatively unnoticed is the comparative analysis included in Kubursi's report. His analysis showed that investments in universities tend to have greater economic impact than would be the case if those funds were invested in almost any other sector. The reasons for this particularly beneficial impact are three-fold:

- A very high percentage of university expenditures (direct) and the subsequent expenditures triggered by the initial expenditure (induced and indirect) are made in Ontario. Compared to other sectors that may purchase a large share of inputs abroad, universities tend to spend their money at home.

[5] Regardless of sector, economic impact studies tend to assume that the initial expenditure (investment) is being made with funds that are already available to the investing organization. In other words, economic impact studies do not necessarily include the financing costs of a public expenditure if there are insufficient funds in the treasury to finance the initiative. In this case, a true cost-benefit analysis from the investor's point of view (the Province of Ontario) should include public financing charges as well as the expenditure itself. The definition of "a good investment" would presumably require that the economic return on the investment be great enough to cover the borrowing costs (interest) *and* earn as good—if not better —rate of return than any other use of those borrowed funds. The exclusion of public financing costs from economic impact studies may have left many observers scratching their heads, trying to figure out why analysts claim a positive return on a wide range of public expenditures but governments, more often than not, have been in a deficit position at the end of the fiscal year. In 1998-1999 for example, interest on the public debt (attributable to deficit financing in earlier years) amounted to 16 per cent of provincial expenditures or $8.7 billion.

[6] See the accompanying literature review compiled for the Council of Ontario Universities for more detailed analysis of these studies.

- Part of the reason for high proportions of domestic expenditures is the fact that universities spend a high proportion of their funds in the form of salaries and wages. This means the job creation impact of expenditures at universities is higher than in many other sectors.[7]

- Third, since jobs created at universities tend to be relatively high-paying positions, the tax revenues are more substantial.

The objective of this component of the study was to estimate the economic impact of institutional expenditures through universities for the system as a whole (all universities taken together). However, Kubursi's work provides the economic multipliers to allow calculation of impacts for each individual institution as well. These have been updated and presented in the technical appendices accompanying this report.

A Brief Description of the Kubursi Model:

The economic impact model employed by Kubursi was an Input-Output Model in which the direct expenditures of all Ontario institutions were "followed through" the economy on a sector by sector basis to determine both the direct and indirect effects of these expenditures. The *direct effects* are the values associated with the initial expenditures—the sums of money expended on materials *and* the effect of expenditures made by faculty and staff as a result of the universities' payroll. In other words, it is not the payroll itself but the effect of that payroll as it is expended initially in the economy that is included in the direct effects. The *indirect effects* are the "ripple effects" as these initial expenditures are spent again and again in the economy. For example, when the university purchases photocopy paper, the company which makes this sale pays its supplier, which in turn pays its suppliers, and so on. The payment to the supply chain is the indirect effect. For both direct and indirect effects, some portion of the expenditures will be used to pay employees. In that sense, any expenditure—regardless of type—can be said to contribute to job creation. The magnitude of the job creation impact is highly dependent on the sector in which the expenditure is made.

The precise calculation of economic impacts in an Input-Output model is based on the amount of each good or service that must be used (as an input) to produce that good or service. The type and mix of these goods and services varies considerably depending on the product.

[7] For the Ontario economy as a whole (1996), wages, salaries and supplementary income accounted for 53.3 per cent of Gross Domestic Product (at market prices).

In Canada, the Statistics Canada input-output tables track the input mix for a wide range of goods and services per unit of product. Based on the types of expenditures made, the Input-Output model can be used to add up all the effects of any injection into the economy and provide a combined total impact estimate. This is a detailed and complex process that is carried out using a computer-based model updated by Statistics Canada from time to time based on new information on the structure of the Canadian economy. This is the model used by Kubursi in 1992 and is the basis for the results presented in this report.

Some Key Definitions:

The *Gross Output* of an industry consists of the value of all the *goods and services* produced by that industry. It includes the value of any inputs that were purchased for incorporation into the end product (for example, the steel that must be purchased to make an automobile). As a result, the output from one industry (the steel industry) is counted again as an input for another industry (the automotive sector). When tallying up the value of goods produced for the economy as a whole, this means the same product gets counted twice.

The *Gross Domestic Product* is the total value of all the *goods and services* produced with an adjustment made to eliminate this double-counting. As a result, GDP is often referred to as the industry or economy's "value-added" and is less than Gross Output.

Labour Income is the value of wages and salaries (either directly or indirectly depending on the particular calculation) expended to produce a product or provide a service.

The *employment multiplier* is a measure of the job creation impact of expenditures in a particular sector and is presented in terms of additional jobs per job created by the initial expenditure. In other words, in a sector with an employment multiplier of 1.88, for every job created or sustained by the original expenditure, another 0.88 of a job would be created by the "ripple effect" of those expenditures through the economy. Sectors with higher multipliers are said to have more potent job creation impact. The university sector is one of those sectors.

Institutional Expenditure Impact: How We Came Up With The Numbers

Based on consolidated (system-wide) expenditure data provided by the Council of Ontario Universities, our approach to this component of the study was to update the Kubursi results to generate new estimates of economic impact from institutional expenditures. As well as incorporating more recent expenditure data, a comparison between the data used in 1992 and that proposed for use in 1998 revealed that there has been a slight change in the overall *allocation of economic expenditures* within universities since 1992. In particular, the proportion of expenditures going to salaries and wages rather than purchases of material goods has declined over that six-year period. In 1992, the share of salaries and wages in operating expenditures (General Expenditures) was about 70 per cent (excluding employee benefits). In 1998, the share had dropped slightly to just under 59 per cent[8].

Since the employment impact of money expended on salaries and wages is typically greater than the employment impact of funds spent on purchases of material goods, adjustments to the multipliers required for this analysis were required. The methodology for adjusting these multipliers is contained in Appendix A: Table A-A Two.[9] In essence, a weighting factor was developed for each of the salary and wage, and non-salary components of expenditures to reflect the change in the balance of expenditures between salaries and wages, and non-wage (materials) purchases by the university sector.

Application of these weighting factors to 1998 data has the net effect of shifting the balance of importance for these two factors (wage and non-wage expenditures) in the Gross Domestic Product multiplier. The same shift is reflected in a slightly less powerful employment multiplier. As Table IP-One below indicates, the statistical significance of the shift between salary/wage and non-wage expenditures has the effect of reducing the Gross Domestic Product multiplier by about 0.12. It also has the effect of reducing the employment multiplier by about 0.10. The Gross Output Multiplier, on the other hand, has increased by 0.30 because a larger share of university expenditures is going to materials rather than wages.

While the ideal circumstance would be to repeat the original use of the Statistics Canada Input-Output model, we believe this procedure provides a mechanism for generating impact values that are reasonably accurate and appropriate for the purposes of this study.

[8] Operating expenditures on salaries and wages (excluding benefits) in 1992 were actually higher than in 1998 (approximately $ 2.26 billion compared to $2.07 billion). In that same period, total initial expenditures in the system went up from $4.1 billion to $4.6 billion. Non-wage expenditures rose, as a proportion of the total, from about 30 per cent to approximately 41 per cent.

[9] We note that the multipliers generated by this methodology are approximate only; the most precise approach would be to repeat the use of the Statistics Canada input-output model. Unfortunately, this opportunity was not available to us on a sufficiently timely basis to allow its inclusion in this study. Note that the 1996 version of the I-O model is still in use, so even this approach would not capture all the potential changes in the underlying structure of the economy. If a re-run were to be completed, it would make more sense to do it after the new version of the model is released, presumably later in the fall of 2000.

Table IP-One: Updated Economic Multipliers - Total Expenditures

Multiplier:	1992 Multiplier	1998 "Weight"	1998 Weighted Multiplier
Labour Income	2.61	0.769	2.61 x 0.769 = 2.01
Gross Output	2.04	1.147	2.04 x 1.147 = 2.34
Gross Domestic Product	2.27	0.947	2.27 x 0.947 = 2.15
Employment	1.88	0.947	1.88X 0.947 = 1.78

While the relative proportions of wage to non-wage expenditures have changed, three other assumptions were made for elements of the analysis where there was no evidence to suggest significant change:

- The *proportions of total sectoral expenditures* made via General (operating) funds and Restricted (capital) funds have remained the same. In each of 1992 and 1998, 75 per cent of total funds expended were General while 25 per cent were Restricted (See Appendix A: Table A-A One).

- The proportion of university *expenditures made in Ontario* as compared to out-of-province expenditures was assumed not to have changed significantly since 1992. At that time, imports accounted for 25.5 per cent of total gross output associated with university expenditures. (The provincial average at the time was 38 per cent).

- The impact of a dollar's expenditure in any *particular sector* of the Ontario economy was assumed not to have changed significantly since 1992.

The Impact of University Expenditures Compared To Other Sectors:

For public investors (governments providing funds to Ontario universities), one natural question is the relative wisdom of investing in university education as compared to other "products". Table IP-Two shows the Gross Output multipliers for a variety of commodities in the Canadian economy.[10] Compared to the Gross Output multiplier determined by Kubursi's analysis (adjusted from 1992 to 2.34), expenditures on university education "output" would appear to have more impact than almost any other economic "product". We note that the multiplier effect appears to be greater for university education than business services, government services, health or social services, or the automotive sector. In other words, expenditures on education are more potent economic stimulants that virtually any other good or service.

[10] This data comes from the Statistics Canada report, The Input-Output Structure of the Canadian Economy, 1995 and 1996, which is the most recent available data of its type. Catalogue No. 15-201-XPB.

Table IP-Two: Gross Output Multipliers for Selected Products[11] (1995 and 1996)

Product	Gross Output Per Dollar of Output (Expenditure) (rounded to second decimal place)
Agricultural products (other than grain)	2.05
Business and computer services	1.44
Electrical, electronic and communication products	1.41
Finance, insurance & real estate service	1.58
Government sector services	1.44
Health and Social Services	1.28
Leather, rubber and plastics	1.50
Lumber and wood products	1.94
Meat, fish and dairy products	2.59
Motor vehicles, transportation & parts	1.46
Private education services	1.31
Residential construction	1.78
Retailing	1.49
Textile products	1.45
Wood pulp, paper & paper products	1.78

Key Economic Indicators of the University Sector:

Another way to look at the economic importance of the university sector is by assessing its size relative to other well-known industries. Several of these measures are presented in Table IP-Three below. Note that the GDP for Ontario's university sector is larger than *any* of the province's plastic products, textiles, paper products, fabricated metal, electrical and electronic products, communications, or chemical products industries.[12]

Table IP-Three: Key Measures for the University Sector

Measure:	(in $ billion – 1998)
Initial Expenditures	$ 4.684
Gross Output	$10.944
Gross Domestic Product	$10.076

[11] This chart presents selected products only. Other products for which Statistics Canada compiles data have similar or lower gross output multipliers than those presented in this chart.

[12] This data comes from the Statistic Canada report, Provincial Gross Domestic Product by Industry, 1984-1998, Catalogue No. 15-203

Employment in the University Sector:

Compared to many other economic sectors, the university sector is a powerful engine for employment. Table IP-Four below, which shows employment per million dollars of output, demonstrates that the education sector generally provides more employment per dollar than any other sector and has an employment impact that is double that of either the health and social services sector or the business services sector. Retailing, accommodation and food services, non-profit institutions serving households, and other service industries also sustain substantial employment but none matches the employment impact of the educational sector.

Alternative Approaches To Calculating Employment Estimates:

If we were to use the general Statistics Canada 1992 Employment Factor for Educational Services shown below[13], the university sector would be viewed as sustaining a total of 206,142 person-years of employment ($4,684 million times 44.01 per million[14]). Most of this would be direct employment (at the universities themselves or in the closely-related industries supplying the materials used at these institutions). Given that the direct employment impact for educational services has an employment factor of 36.60, this would suggest that 171,434 person-years of employment are direct in nature. By the same type of analysis, we could estimate that the indirect impact (the effect of direct expenditures rippling through the economy in subsequent economic transactions) accounts for 34,708 person-years of employment. This employment profile (direct/indirect ratio) differs from Kubursi's 1992 profile, which would suggest that either the university sector has a different profile than other educational services or there has been a shift in employment impact in the educational services sector since 1992 with more of the impact being direct in 1996. In 1992, for example, the relative contributions of direct and indirect impacts, as calculated by Kubursi, were almost identical (53 per cent direct, 47 per cent indirect). By 1996, the most recent year for which employment impact figures are available, these contributions appear to have shifted to the point where 83 per cent were direct and 17 per cent were indirect.

[13] The values in Table IP-Three, from which the Employment Factor For Educational Services is drawn, comes from detailed analyses of each sector, particularly the expenditures going to wages and salaries in each sector. This leads to a calculation of the total employment for a particular sector, from which a calculation is made on the basis of employment per million of expenditure in that sector.

[14] This is almost identical to the 44.3 person-years of employment per million dollars of expenditure that Kubursi used in 1992, suggesting that the total employment impact of the sector has not changed markedly since that time. Kubursi's estimate would have been calculated in a similar fashion — the total expenditures of universities and their colleges divided by the total employment impact as determined by the Statistics Canada Input-Output model.

Table IP-Four: Employment Per Million Dollars of Industry Output (Selected Industries)

Sector	Total Direct Employment (per $ million)	Total Indirect Employment (per $ million)	Total Employment (per $ million)
Accommodation & food services	25.36	5.83	31.19
Agricultural & related services	12.78	9.19	21.97
Business services	17.14	4.83	21.97
Construction	8.84	6.07	14.91
Communication & utilities	5.68	3.15	8.83
Educational services	*36.60*	*7.41*	*44.01*
Finance, Insurance & real estate	3.73	4.62	8.35
Health and social services	17.07	2.49	19.55
Manufacturing	4.53	5.15	9.68
Non-profit institut. Serving hhlds.	23.01	4.81	27.82
Other service industries	23.29	5.36	28.65
Retail trade	27.42	4.71	32.13

For the purposes of *this study*, we have chosen to retain the original (1992) employment impact (44.3 person-years per million in expenditure), the direct-indirect employment ratio (53/47) and the Kubursi employment multipliers as the starting point for calculating the 1998 employment multipliers. The primary basis for this decision is that the Kubursi work was a specific study for the university sector as opposed to all educational services. The employment profile of other educational services (such as primary/secondary and community college education) may be different than that of universities. Secondly, the employment profile outlined on the preceding page is Canadian rather than specific to Ontario. And finally, this data is from 1996. Given the funding reductions affecting the university sector in the 1996-1998 period[15], 1996 may have represented the "high water mark" for the employment impact of expenditures of universities.

With these factors in mind, we believe that the best estimate of employment impact from expenditures in the university sector is derived by taking initial expenditures ($4.684 billion) and applying the 1992 Kubursi employment estimator (44.3 person years per million). Normally, this would yield a total (direct and indirect) of 207,501 person-years of employment from university sector expenditures. However, when a scaling factor of 0.947 is applied to account for the internal shift in those expenditures (from salary and wages to material goods), the total employment impact would be reduced slightly to **196,526** person-years of employment[16]. This is roughly evenly divided into direct impact (104,535 person-years) and indirect (91,991 person-years) based on the original employment multiplier of 1.88. This approach allows us to adjust for internal shifts in expenditures while holding the direct-indirect distribution constant.

[15] Provincial operating grants declined from $1.823 billion in 1995-1996 to $1.550 in 1996-1997 (Actual $). By 1998-1999, provincial operating grants had risen to $1.596 billion. Source: Ontario Universities - 1999 Resource Document, Council of Ontario Universities, April 2000

[16] This is done by applying the employment multiplier weight of 0.947 to the total employment estimator (44.3 times 0.947 = 41.952), then used the 1.88 multiplier to "allocate" total employment between direct and indirect impacts.

The Out-Of-Province Student Premium:
Personal Expenditures by Students at Ontario Universities

Many economic impact studies for individual universities include the estimated value of student spending in the host jurisdiction as one of the components of economic impact. Typically, tuition fees and other ancillary costs are omitted from these calculations to avoid double-counting (they would be included on the revenue side of the institution's accounts and would therefore be expended by the institution). These practices are embedded, for example, in the economic impact model developed by the American Council on Education (the ACE model)[17] that has been used by many Canadian institutions for assessing the economic impact of their institution on the local or regional economy. While this approach makes sense when looking at an individual host community, it is inappropriate when assessing the province-wide impact of the university sector. The argument can be made that regardless of where—or if—an Ontario-resident student attends university, their expenditures are essentially the same[18]. Except for expenditures such as textbooks or other educational supplies, a young person will have roughly equivalent living expenses whether or not he/she attends university. Therefore, the economic impact of universities due to student expenditures ought not to be counted in any calculation of returns to the Province from its investment in higher education. In general, we have adopted this approach for our economic impact analysis.

The exception to the student expenditure rule is out-of-province (including international) students. Whether students are from another province or another country, the argument can be made that the living expenses of out-of-province students would not have taken place *in Ontario* if that student had remained in their home province or country. As a result, our economic impact analysis included an estimate for the living expenses of out-of-province students at both the graduate and undergraduate level[19]. We call this estimate the annual "Out of Province Student Premium".

[17] See Laurentian University: Making an Impact in Sudbury. Prepared by Debra MacLennan. May 1995 for a summary description of this model.

[18] The assumption has been made in this study that student living expenses are the same as a non-student of the same age would incur. In a subsequent section (Education Premium), we calculate the difference in after-tax disposable income between students and non-students for a typical four year university program. In effect, this procedure takes into account any real expenditure differences that might exist between the group and avoids any possible double-counting by trying to estimate that difference in this section of the study.

[19] The argument could be made that the estimate should adjust for students who leave Ontario to pursue a university education since their living expenses would represent a net outflow of funds from Ontario's economy. However, we have chosen not to make this adjustment on the basis that the objective of this study is to examine the economic impact of Ontario's existing university system—with the accompanying number of existing student places—not the net impact of Ontario's university-bound population.

We note that this calculation does not include any estimate of the economic benefit to Canada—or Ontario—as a result of the potential long-term benefit that accrues to the domestic economy as a result of "hosting" international students at Ontario universities. Anecdotal evidence would suggest that the academic and personal relationships that begin with an individual's post-secondary education in another country can translate into economic relationships at a later point in that individual's working life. However, at the moment, there is no way to estimate the magnitude of this benefit or evaluate the cost-benefit relationship.

Out-Of-Province Premium: How We Came Up With the Numbers

The Out-Of-Province (OOP) Premium was calculated in two parts, one that reflects undergraduate student expenditures and a separate calculation reflecting graduate student expenditures (See Appendix A: Table A-B One). Based on data provided by the Council of Ontario Universities[20], we were able to estimate the number of out-of-province students by year for each of the years 1995-1996, 1996-1997, 1997-1998, and 1998-1999. These numbers represent the out-of-province student population in fourth, third, second and first years respectively. Consolidating this data provided an approximate equivalent to the undergraduate student population that would have been in attendance at Ontario universities in 1998-1999.

Having estimated the total number of out-of-province students, we multiplied this number by the average living expenses of a student as determined by recent self-administered questionnaires with more than 3000 students[21]. The per-student living expense estimate ($6,911.00) was discounted by five per cent to allow for 1) inflation that would have occurred over the 1998 to 1999 period and 2) modest savings that would, by definition, have been directed away from the consumer goods economy. The direct effect of the remaining expenditures is an additional $162.3 million in economic activity. By applying a multiplier of 2.0[22], the combined effect of direct plus indirect impacts (the initial expenditures plus those generated by the ripple effect of the subsequent transactions) in the Ontario economy as a result of OOP undergraduate students is estimated at approximately $324.7 million (1998).

[20] Compendium of Statistical and Financial Information, Ontario Universities, 1998-99, June 2000, produced by the Council of Ontario Universities, June 2000, C-5, page 13

[21] These interviews were conducted on five Ontario campuses in cities of different sizes, with 3,411 students responding. The study was conducted in 1999.

[22] The multiplier of 2.0 was used in several other studies estimating effects of student expenditures and is close to the average multiplier for gross domestic product calculated by Kubursi.

The calculation for OOP graduate students is similar. The only difference is that living expenses for this group of students tend to be higher. Several studies, including one on the expenditures of international students in Ottawa-Carleton in 1998[23], indicate that annual living expenses are approximately $11,000 per year. Again, tuition fees are not included in these figures. Data provided through Statistics Canada allowed us to estimate the number of graduate students at Ontario universities who are either out-of-province or out-of-country. Multiplying the living expense figure times the number of OOP graduate students on Ontario university campuses in 1998 indicates that this group contributes a further $41.6 million to the Ontario economy.

Based on the assumption that all of these expenditures are subject to made in Ontario and 45.9 per cent[24] of these expenditures are subject to provincial sales tax, the PST purchases on these transactions from undergraduate and graduate students amounts to **$13.5 million** in revenues for the provincial treasury. This estimate includes both the initial expenditure as well as the multiplier (ripple) effect as these expenditures become the basis for further economic transactions over and over again through the economy.

Note that calculations for both groups do not include tuition fees since these would be included in the expenditures by individual institutions. (Revenue received by the universities in the form of tuition revenues would show up as part of the institutional expenditures by the institution rather than the students themselves).

The total dollar value of direct and indirect expenditure impacts from out-of-province student spending is $352.9 million (See Appendix A: Table A-B One). Assuming that jobs are created on the basis of 25 full time equivalents per million in expenditure, these expenditures would sustain a total of 8,821 jobs. This may be regarded as a conservative assumption because even though some student expenditures would undoubtedly "leak" outside Ontario as suppliers purchase goods outside the province for sale within Ontario, the jobs associated with these expenditures are presented here as full-time positions rather than positions. Some share of the expenditures would certainly be used to hire part-time staff, which would mean the actual numbers of job opportunities would be higher than projected here. However, we have chosen to retain the 8,821 figure to allow common units of measure (full-time equivalents) in consolidating all job creation data.

[23] The Economic Impact of International Post-Secondary Students on the Ottawa-Hull Region, 1997, with special reference to Carleton University. Information for this report was taken from a study prepared by Norman Hillmer and Dean Oliver for the Department of Foreign Affairs and International Trade, 1998.
[24] This percentage is drawn from Statistics Canada data from 1998 indicating the proportion of expenditures that are goods rather than PST exempt services).

The Innovation Premium:
The Economic Effects of Research and Development Spending At Universities

Estimating the economic impact associated with innovation emerging from universities is one of the most difficult aspects of any attempt to capture the real return on investing in higher education. In fact, this challenge has moved to centre stage in discussions on the relationship between technological change and productivity growth[25]. The paucity of data and research on the *accuracy* of various estimators (ex. patent activity, licensing revenue) to support sound estimates of economic impact mean that, at this time, any estimates are highly speculative.

While lack of data is one limitation in assessing economic impact of innovation, the sheer complexity of the innovation-economic impact relationship is another. Economic impact which has its origins in university-based innovation may show up in a variety of ways[26] —for example, in consulting activity by individual faculty members[27], new companies created as 'spin-offs' from the original research[28], informal ventures between university faculty and off-campus partners, and licensing of innovations to existing firms. Knowledge transfer also takes place as a result of individuals with innovative ideas and capabilities moving from the university setting to a commercial environment where their ideas can be incorporated into product and service development. The most frequent—though certainly not the only—transfer agent is the university graduate. In their consulting role, faculty may also fulfill this function.

While some of these relationships are quite explicit, others may be more difficult to define and quantify. For example, most policy makers acknowledge that science and technology infrastructure such as a research-intensive university is a critical factor for the emergence of economic clusters in particular regions.[29,30]

[25] See Linkages Between Technology Change and Productivity Growth, Industry Canada, Occasional Paper Number 23, May 2000

[26] See The Evaluation of Research Done in Post-Secondary Institutions; Langford, Cooper H., University of Calgary, 1998

[27] Reporting of faculty consulting activity is a hit-and-miss affair. Less than a third of universities require faculty to report consulting activity. See Survey of Intellectual Property Commercialization in the Higher Education Sector, Statistics Canada, 1999, page 13

[28] The Statistics Canada report, Survey of Intellectual Property Commercialization in the Higher Education Sector, 1999 (page v), identifies 454 spin-off companies in Canada associated with university-based intellectual property. By comparison, the hospital sector is considered to have just 17.

[29] Building Competitive City Regions in the Knowledge Economy: The Power of Business-Community-Educator Partnerships, Canadian Urban Institute, April 2000, page 11

[30] An Industry Canada report indicates that the Ottawa-Carleton high-tech sector emerged as a result of proximity to government labs and Bell-Northern Research rather than universities. See The University-Industry Relationship in Science and Technology, Industry Canada, Occasional Paper Number August 1995.

The process for converting campus-based innovations to commercialization, and therefore, an economic impact, can be complex, time-consuming and leave many casualties along the way. For example, not all potentially valuable intellectual property that originates at a university is disclosed to the institution's technology development offices. Of the disclosures that do occur, perhaps only one in ten has market application. There is relatively little data available to provide TDOs with guidance on the best choice for economic development purposes (example: licensing to an existing enterprise versus start-up of a new business). And even among those innovations with market potential, not all will be licensed successfully or be the centrepiece of a new business venture.

Despite the winnowing process, those innovations that do make it to market spawn other related developments. For example, licensing agreements appear to spark pre-production investment in a ratio of about 100:20. In other words, every dollar spent on licensing may trigger 20 cents in pre-production expenditures. There is also likely to be substantial equity investment to bring new products and services to market[31]. In short, while relatively few innovations generate big payoffs, the economic impact from those that do make it to the marketplace is substantial.

The Innovation Premium: How We Came Up With The Numbers

This economic impact study provides estimates for just three components of the total potential impact of innovation (See Appendix A: Table A-C One and Table A-C Two):

- the economic activity generated by spin-off companies;
- the pre-production activity associated with licensing; and
- the paid consulting carried out by faculty.

This study does *not* estimate the total value of capital *investment* in Ontario as a result of university-based innovation. Although anecdotal examples are available, there is simply no data available across the system on which to make such a calculation.

It is possible—indeed likely—that there are licensing, consulting and other revenues paid directly to faculty and/or graduate students which does not get recorded as part of the annual estimates of research and development impacts made by university officials.

[31] For example, since 1986, the Business and Technology Development Program operating out of the North Carolina Biotechnology Center has invested more than $6 million in more than 50 emerging companies. This investment has attracted a further $361 million in financing from other sources and created in excess of 900 jobs. One of the few known examples where investment has been tracked and reported, NCBC-related companies appear to attract an average of $7 million in investment for every $120,000 invested in an emerging company. See Growing Ontario's Innovation System: The Strategic Role of University Research, Heather Munroe-Blum, December 1999, page 55.

The economic impact of licensing revenues paid to institutions as a result of innovations has not been included to avoid double-counting (since most of this revenue would already be included in institutional expenditures.) There is also an unmeasured economic impact as a result of private sector expenditures as a result of licensing to *existing* enterprises. It is estimated that 1997 Canadian university licensing to existing small and medium-sized enterprises and to large companies is of approximately the same magnitude as licensing to start-ups[32]. This suggests that if the full extent of economic impact of licensing activity were known, it could be three times as large as the spin-off company estimates contained in this report.

Because we know that the calculation of the innovation premium is not comprehensive, it is quite likely that if the true economic impact were known, it would be significantly larger than reported here. In general however, we consider the following estimates to be incremental in that there is no reason to think that any of this economic activity would have taken place in the absence of Ontario's university sector. Secondly, this economic activity is not covered by any of the other study components so it is non-duplicative.

The calculation of the innovation premium from spin-off companies was based on:

- estimating the number of spin-off companies operating in Ontario in 1998 which were created in the previous year as a result of university-based research and development. We have applied an annual sales/revenue value based on the average for all spin-off companies originating from Canadian universities. These estimates are based on data gathered through annual reports submitted by universities. Since there is normally a three to seven year lag between the emergence of a particular innovation and the economic impact associated with it, we acknowledge that use of 1998 data on spin-off companies is assessing the economic impact of prior year's investments in university R&D. However, we also note that we are including only a quarter of the estimated 136 companies operating in Ontario as a result of university linkages. Given that the frequency of spin-off company formation has accelerated in recent years[33], we believe our approach to be a reasonable methodology for estimating a single year's economic payback.
- calculating the annual sales on a per-company basis based on national data and assuming that 100 per cent of sales would be expended. This annual expenditure was then split into two components: a salary and wage (labour) component used to calculate provincial income tax and provincial sales tax, and a non-wage component used to calculate provincial sales tax. The allocation between the two components was 60/40, based on the assumption that as a labour-intensive organization, a spin-off company would have about the same proportion of total expenses invested in salaries and wages each year as would be the case at a university in 1998 (about 60 per cent).

[32] See University Research and the Commercialization of Intellectual Property in Canada, Industry Canada Research Publications Program, Occasional Paper Number 21, April 1999, page 68

[33] Two-thirds of all known spin-off companies in Canada were created after 1990. As many university-related start-up companies were created in the 1994-1997 period (four years) as in the preceding thirteen years (1980-1993), ibid, page 69

- estimating *job creation* based on the national average of 57.7 person-years of employment per spin-off (based on an NSERC study of such firms).
- estimating the *income tax revenues* to federal and provincial governments based on a 20 per cent "discount" for benefits and deductions, a basic personal exemption, a 10 per cent tax deductible savings rate and a 26 per cent marginal tax rate. The .4275 provincial income tax rate in effect in 1998 was used to estimate provincial income taxes from federal income taxes.
- estimating *provincial sales tax revenue* based on the assumption that 80 per cent of expenditures would be made in Ontario. This estimate was used for both expenditures resulting from the salary and non-salary components of total expenditures.

The calculation of the innovation premium from pre-production expenditure from licensing activity was based on the 100:20 ratio mentioned earlier (20 cents of expenditure per dollar of licensing activity). The same assumptions were made for wage/non-wage expenditure determination and the resulting provincial income and sales taxes. Job creation was estimated using an annual gross salary of $31,000 per year, which was the Ontario average at the time this activity would have been taking place.

The calculation of the innovation premium from consulting activity was based on the assumption that for every dollar of licensing activity for Ontario universities, there is a dollar of paid consulting activity involving faculty, staff or graduate students from the university community. This is an incremental form of economic impact because it is not captured as part of the institution's expenditures. The same ratio of salary to non-salary expenditures was used and the same assumptions for the calculations of provincial income and sales taxes. The only variation is that an additional five per cent "leakage" was applied to the non-wage expenditures to account for any university overhead charges that may have applied if the consulting work required use of university facilities or equipment.

For all components, a multiplier of 2.0 was used to estimate the indirect impact of expenditures in the economy as a result of any of these forms of activity.

Concluding Comments:

A summary of direct and indirect estimates is presented by component in Table R&D-One. They reveal that the incremental economic impact on the provincial treasury was **$38.8 million** in 1998 with just over **2,400** jobs being attributable to this economic activity. Again, we observe that this estimate is likely to be an underestimate; if data were available to include all elements of the economic impact from innovation, we believe the estimates presented here would be significantly higher.

Table R&D-One: Economic Activity from Innovation Originating From University-Based Research and Development

	Direct	Indirect	Total
Spin-off Companies:			
Provincial Income Taxes from Wage Expenditures	$ 8,478,932.33	0	$ 8,478,932.33
Provincial Sales Taxes from Wage Expenditures	$ 7,448,922.00	$ 7,448,922.00	$ 14,897,844.00
Provincial Sales Taxes from Non-Wage Expenditures	$ 4,836,451.68	$ 4,836,451.68	$ 9,672,903.36
	$ 20,764,306.01	**$ 12,285,373.68**	**$ 33,049,679.69**
Pre-Production Expenditures:			
Provincial Income Taxes from Wage Expenditures	$ 1,724,528.61	$ 0	$ 1,724,528.61
Provincial Sales Taxes from Wage Expenditures	$ 838,003.73	$ 838,003.73	$ 1,676,007.45
Provincial Sales Taxes from Non-Wage Expenditures	$ 943,697.89	$ 943,697.89	$ 1,887,395.78
	$ 3,506,230.22	**$ 1,781,701.61**	**$ 5,287,931.84**
Consulting Activity:			
Provincial Income Taxes from Wage Expenditures	$ 195,301.23	$ 0	$ 195,301.23
Provincial Sales Taxes from Wage Expenditures	$ 77,292.00	$ 77,292.00	$ 154,584.00
Provincial Sales Taxes from Non-Wage Expenditures	$ 40,013.21	$ 40,013.21	$ 80,026.42
	$ 312,606.44	**$ 117,305.21**	**$ 429,911.64**
Total Economic Impact	***$ 24,583,142.67***	***$ 14,184,380.51***	***$ 38,767,523.17***
Job Creation - All Components (in person years)	1341.90	1076.55	2418.44

The Education Premium:
A Lifetime of Private and Public Pay-back on a University Degree

When assessing the public and private returns associated with an individual's decision to obtain a university degree, researchers are virtually unanimous[34] on one point: getting one or more university degrees is a good individual (or private) investment from an economic perspective. In short, the higher earnings associated with a university degree have more than recovered the individual's contributions to the costs of their own education. Only a few studies have addressed the question of *whether or not the investment in an individual's university education is a good one from a public perspective*, that is the perspective of the organization that—in Ontario at least—covers a major share of those costs: the provincial government.

The approach taken in this study to answer this question is similar to that used in previous rate of return studies, which is the lifetime earnings approach. In general, these studies estimate the lifetime earnings of an individual who has obtained a university degree and compare them to the lifetime earnings of an individual who has not pursued a university degree. In other words, the comparator group is individuals who have graduated from high school. By comparing the two groups, it is possible to estimate the additional or *incremental* earnings enjoyed by university graduates over their working lives. At this point, study methodologies diverge, depending on whether the objective is to examine private or public returns to education. For *private* rate of return studies, the incremental earnings are compared to private costs, and using the net present value method, a rate of return is calculated. This rate of return can then be compared to alternative investment opportunities to see if investing in a university education is better, worse or about the same as other possibilities.

When applied to calculating a *public* return on investment, the procedure is similar but requires an extra step, which is the calculation of tax revenues that would flow to the investing government as a result of the higher earnings of university graduates. These revenues are then compared to the funding agency's per-student costs of educating an individual student over the years that he/she is pursuing higher education. The resulting rate of return calculation allows public organizations to assess the tangible pay-back on a university education in relation to alternative uses of the same funds.

The lifetime earnings methodology has been modified slightly to suit the objectives of this economic impact study (to summarize the incremental annual economic impacts of the university sector using 1998 as the reference year). The approach to calculating the *incremental* or additional earnings that a university degree holder receives as a result of obtaining this education followed these steps:

[34] See the literature review prepared for the Council of Ontario Universities by Enterprise Canada Research (September, 2000) for a more complete treatment of this issue.

- The most recent average income data (1995)[35] for males and females in each age group were applied to each year in an individual's anticipated work life of 44 years to generate an annual earnings time series for both high school graduates and holders of university degrees. Note that the income data is for individuals who have *completed* the specific level of education.

- These time series were weighted by gender to provide an average annual income for each category (high school graduates and holders of university degrees) for each of the years in the workforce. The weighting was based on the proportions of men and women in each of the age groups.

- The average annual incomes for each year were adjusted from 1995 to 1998 data using a fixed-weight average hourly earnings index[36]. For the period in question, the index rose from 143.9 to 151.6, an increase of 5.4 per cent. The working assumption was that wage rates for both groups (high school graduates and holders of university degrees) would increase in rough proportion to this index.

- To calculate the annual education premium for the bachelor degree holder group, the university degree holder's annual incomes were discounted to eliminate the impact of higher earnings among those who hold a graduate rather than an undergraduate degree. Other research[37] has shown that grouping undergraduate and graduate degree holders' incomes together in the same category tends to overestimate the earnings premium accruing to the holder of the bachelor's degree. This is an important adjustment for any calculations that compare the costs of a university degree with either the private economic benefits accruing to the individual or the tax revenues that flow to a public treasury as a result of higher earnings. Often, the bachelor's degree holder is chosen for this type of comparison. For this study, a discount factor of 12 per cent was applied[38]. (This adjustment was not required for calculation of the education premium for holders of masters or doctorate degrees.)

- The *incremental earnings* of a bachelor's degree holder compared to a high school graduate were calculated for each year in the workforce by subtracting the annual income of the second group from the first. This step is required to ensure that calculations are done and comparisons made only for earnings that accrued to the individual because of his/her university education. The literature on the correlation between higher education and higher earnings is virtually unanimous on this point.

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[35] Returns to Investment in University Education in Ontario, 1995. By David A. A. Stager. December 1998 (unpublished). This income data groups bachelor degree holders together with holders of first professional degrees.

[36] Selected economic indicators, Provincial Gross Domestic by Industry, Statistics Canada, page 106

[37] See the literature review prepared for the Council of Ontario Universities by Enterprise Canada Research (September, 2000) for specific study references.

[38] In "Earnings, Education and Experience" 1996, Rupert, Peter, Schweitzer, Mark, Severence-Lossin, Eric and Turner, Erin determined that this approach overestimates bachelor degree holder earnings by about 12 per cent. Because this study compared bachelor degree holder earnings with high school graduate earnings, the earnings of the former group were discounted by 12 per cent to adjust for this effect.

While researchers have speculated about whether it is appropriate to attribute all of the additional earnings to education per se, no one has offered evidence to substantiate a discount factor for other influences. As a result, the working assumption in this study is that all of the incremental earnings are attributable to higher education.

- After-tax incomes were calculated for each age cohort for both high-school graduates and bachelor degree holders based on a personal exemption of $6,456.00 per person and a 26 per cent marginal tax rate.[39] This step was necessary to be able to establish the after-tax resources that each group would have at each age to make expenditures in the marketplace (which in turns generate provincial sales tax and goods and service tax revenues). This calculation is also the first step in calculating the incremental *personal income* tax revenues that would have accrued to the federal and provincial governments as a result of incremental earnings.

- An *annual education premium* accruing to the individual was then calculated by taking the difference between the *after-tax* incomes of the two groups. This was required to allow calculation of market expenditures that would be subject to either *federal or provincial sales tax* (GST or PST).

- The annual education premium was adjusted for the costs of a university education in the first four years, a period of time in which the bachelor degree holder would be paying tuition, books and other costs of education while the high school graduate would be in the labour force. The value of this adjustment is for assessing the private (personal) rather than public (state) payback from pursuing a university degree. It is not used directly in the calculation of public payback. Note that personal living expenses were not considered in the costs of education for the purposes of this calculation since it was assumed that the individual would have these costs whether or not they attended university. Foregone income as a result of attending university (rather than entering the full-time labour force immediately after high school graduation) is accounted for by the assumption of lower annual earnings for university degree holders for the age years 17-21.

- The *incremental income tax revenue* to the federal government was calculated as the difference between pre and after tax earnings of bachelor degree holders less the difference between pre and after tax earnings of high school graduates. This calculation assumed a basic deduction of $6,456 and a ten per cent RRSP-deductible savings rate, with the remaining taxable income being subjected to a 26 per cent tax rate.

[39] This rate may be too low given the tax brackets of many university degree holders. However, we have not taken into account non-RRSP deductions that could offset the higher tax rates.

- The *incremental market expenditures* were calculated as the after-tax income with tuition expenditures removed from the calculation (since these payments are made to the university, which then expends the funds to deliver educational services). Removing this expenditure category avoids double-counting. This calculation also assumed that 90 per cent of incremental market expenditures would be made within Ontario; in other words, 10 per cent of expenditures would "leak" out of the provincial economy.

- The *incremental sales tax revenues* were calculated as a percentage (seven per cent for GST and eight per cent for PST) of the total incremental market expenditures. The GST was assumed to apply to all expenditures while the PST was assumed to apply only to the share of personal expenditures that would have been made on goods rather than services which are PST exempt (45.9 per cent in 1998). These calculations assumed a ten per cent savings rate and that five per cent of incremental market expenditures would be non-taxable. This provides an estimate of a second annual revenue stream accruing to the federal and provincial governments respectively as a result of the higher earnings of bachelor degree holders.

- The same incremental approach was used to calculate comparable values for the holders of masters and doctorate degrees, with the exception that some adjustments were required to ensure that variations between the two groups (for example, annual earnings) were reflected in the calculations.

Additional detail is provided in the technical appendices. However, the following summary tables offer an overview of the magnitude of the economic impacts on the provincial and federal treasuries as a result of graduates' incremental earnings. A summary of job creation impacts is also provided.

Table EP-One: A Summary of Provincial Revenue Impacts Due To Incremental Earnings

Summary of Impacts	Income Tax Revenues To Province	PST Revenues To Province	Total Prov. Revenue
1998 From All Years			
Bachelor Degree Holders	$ 1,257,798,708.80	$ 370,959,665.68	$ 1,628,758,374.48
Masters & Doctorate Degree Holders	$ 461,826,271.53	$ 10,896,428.38	$ 472,722,699.91
Total 1998 From All Years	**$ 1,719,624,980.33**	**$ 381,856,094.06**	**$ 2,101,481,074.39**
1998 From One Year Cohort			
Bachelor Degree Holders	$ 85,508,543.05	$ 28,019,291.45	$ 113,527,834.50
Masters & Doctorate Degree Holders	$ 18,536,372.24	$ 6,074,321.67	$ 24,610,693.91
Total 1998 From One Year Cohort	**$ 104,044,915.29**	**$ 34,093,613.12**	**$ 138,138,528.41**

Table EP-Two: A Summary of Federal Revenue Impacts Due To Incremental Earnings

Summary of Impacts	Income Tax Revenue To Fed. Government	GST Revenue To Fed. Government	Total Federal Revenue
1998 From All Years			
Bachelor Degree Holders	$ 2,942,219,201.87	$ 707,167,118.68	$ 3,649,386,320.55
Masters & Doctorate Degree Holders	$ 1,080,295,372.00	$ 20,722,058.45	$ 1,101,017,430.45
Total 1998 From All Years	**$ 4,022,514,573.87**	**$ 727,889,177.13**	**$ 4,750,403,751.00**
1998 From One Year Cohort			
Bachelor Degree Holders	$ 200,008,287.83	$ 53,413,681.95	$ 253,421,969.78
Masters & Doctorate Degree Holders	$ 43,359,935.07	$ 11,579,589.06	$ 54,939,524.13
Total 1998 From One Year Cohort	**$ 243,368,222.90**	**$ 64,993,271.01**	**$ 308,361,493.91**

Concluding Comments:

The calculations show that over the course of a working lifetime, the holder of a bachelor's degree will earn (before tax) an average of **$488,519.35** more than an individual who has graduated from high school[40]. In terms of after-tax income, the holder of the bachelor's degree will have **$356,218.06** more funds available than the high school graduate[41]. The difference for a holder of a masters or doctorate degree is somewhat greater as a result of earnings being even higher than those of the bachelor degree holder.

When calculating the additional income tax revenue that will accrue to the federal government from this earnings differential, we find that the bachelor's degree holder will pay $404,077.20 in income taxes compared to the high school graduate's $271,775.91[42]. Based on a 44-year working life, this would amount to about **$3,000.00** per year. However, with adjustments made for additional tax-deductible savings capability for higher income earners (estimated at 10 per cent), the incremental lifetime income tax revenue is **$119,071.00** or about **$2,700.00** per year.[43] Following the same approach, the incremental annual income tax for the holder of a masters or doctorate degree holder is approximately **$3,030.00** per year. These values are important inputs to the calculations that follow.

[40] This calculation is based on the difference between the average (adjusted) bachelor's degree lifetime earnings, before tax, and the average high school graduate's lifetime earnings, before tax ($1,840,118.84 - $1,351,599.49).

[41] This is based on the assumption that both individuals will remain fully employed throughout the course of their working lives.

[42] This would suggest that a bachelor degree holder would have $339,278.06 more in additional disposable income than would the high school graduate. This estimate has been adjusted for direct educational costs.

[43] Note that no adjustment has been made for unemployment since this calculation is incremental in nature and data for high school graduates and bachelor's degree holders would suggest that the latter group has an very high rate of employment. Similarly, this financial data is nominal; it has not been converted to a standard year. The rationale for this latter convention is that when considering the pay-back from an entire university-educated population, a single year (1998) is chosen and all revenue flows are treated as taking place in that year.

Federal Income Tax Pay-back:

Federal Government:

In a *single year*, the income tax revenue to the *federal* government from the incremental earnings of one year's cohort of university degree holders would be approximately **$243.4 million**. This is derived by multiplying the appropriate average yearly incremental federal income tax increment by the 54,747 undergraduates and 10,597 graduates that completed their degrees in 1997 and would therefore have filed their first tax return in 1998. A multiplier of 1.5[44] has been applied to account for the indirect income tax revenue that would be derived from incremental expenditures in the economy. The resulting value has also been adjusted for the percentage of degree holders expected to be earning income annually (0.90).

The federal income tax payback to the *federal* government from the entire university degree holding group is **$4.0 billion**, which is calculated by taking the average annual incremental federal income tax payment per graduate by the total number of degree holders in each of the bachelor, and masters/doctorate categories. As with the single year cohort, a multiplier of 1.5 has been applied as well as the employment percentage (.90).

Provincial Government:

A *single year* calculation of the *provincial* share of the federal income tax revenue from the incremental earnings of one year's cohort of bachelor degree holders is quite similar to the federal calculation except that the provincial tax rate of .4275 (the provincial tax rate in 1998) must be applied. This works out to **$104 million** for all university degree holders.

The federal income tax payback to the *provincial* government from the *entire* university degree holding group is **$1.7** billion, which is calculated by taking the average annual incremental federal income tax payment per graduate by the total number of degree holders in each of the bachelor, and masters/doctorate categories. A multiplier of 1.5 has been applied to account for indirect effects of incremental expenditures on provincial sales tax and the .90 employment factor has also been introduced.

[44] A multiplier of 1.5 has been used to estimate indirect tax revenues accruing from incremental earnings because the economic impact of personal expenditures in areas of the economy other than the university sector is typically lower than for the university sector (see Table IP-Two for examples). The 1.5 multiplier is used as an average of these other sectors, to take into account the higher leakage of expenditures outside the Ontario economy and the lower proportion of these expenditures paid out in labour income (as compared to universities). However, we note that this multiplier is an estimate only.

Provincial Sales Tax Pay-back:

When calculating the additional provincial sales tax revenue (PST) that will accrue to the provincial government from the degree holder's earnings differential, we took the difference in after-tax earnings between the bachelor degree holder (adjusted for costs) and the person who graduated from high school, then added back in the non-tuition expenditures since these would be subject to PST. This value was adjusted to reflect the percentage of expenditures which would have been subject to PST in 1998 (45.9 per cent), then further subjected to the provincial sales tax rate of eight (8) per cent. Over a working lifetime, if incremental expenditures were directed towards goods in the same proportion as the general population, the bachelor degree holder would pay an additional **$15,012.68** in provincial sales tax. This would work out to about **$341.20** per year. The corresponding value for a holder of a masters or doctorate degree is somewhat greater **($382.14)** as a result of earnings differential being even higher than those of the bachelor degree holder

In a single year, the PST revenue from the incremental earnings of *one year's cohort* of degree holders (bachelors and masters) would be approximately **$34.1 million** (including both direct and indirect impacts). This is derived by multiplying the average yearly PST increment ($341.20 or $382.14) by the appropriate number of degree holders that completed their degrees in 1997 and would therefore have filed their first tax return in 1998. Some additional adjustments are incorporated into this calculation to take into account the percentage of degree holders who may be out of the job market at any point in time and the multiplier effect of these expenditures on provincial sales tax revenues. If considering the PST impact of *all* university degree holders in a single year (1998), the economic impact is considerably higher: **$381.9 million.**

Goods and Services Tax Pay-back:

The federal GST revenue stream from *one year's cohort* of degree holders is larger as the PST stream because while it is calculated at seven (7) per cent of total expenditures rather than eight (8) per cent (PST), it is calculated on all expenditures (after adjustments). In other words, all expenditures—goods or services—are assumed to be subject to GST. The 1998 GST revenue stream is **$65.0 million**, which includes both direct and indirect revenues.

If considering the entire group of university degree holders, the GST payback to the federal government is considerably larger — **$727.9 million**.

A Summary of Pay-back From University-Educated Taxpayers As A Group:

In 1998, there were approximately 805,355 bachelor degree holders and 264,020 masters or doctorate degree holders in Ontario. As a group, these individuals make a substantial *incremental* contribution to provincial and federal treasuries each year:

- On the *federal* front, the total *additional* federal income tax paid to the nation's coffers was approximately **$4.0 billion** for 1998. This estimate includes both direct and indirect impacts by assuming that the direct income tax payments are expended on worthy public programs with an average multiplier of 1.5 (see earlier table for examples of GDP multipliers). The *additional* federal Goods and Service Tax represents another source of federal revenues, the direct and indirect value of which is estimated to be **$727.9 million** for 1998. Again, a multiplier of 1.5 has been applied to take into account the indirect impact of these expenditures. Together then, these two revenue streams added about **$4.75** billion to federal coffers in 1998.

- On the *provincial* front, the total additional provincial income taxes from holders of university degrees in 1998 were about **$1.72 billion**. This is based on the provincial tax rate in force in 1998 (42.75 per cent of federal taxes) and an expenditure multiplier of 1.5 to incorporate indirect impacts. Like the federal government, the Province of Ontario receives another revenue stream from the additional earning power of the bachelor degree holder group: the Provincial Sales Tax (PST). The annual incremental PST for the degree holder group for 1998 is estimated at **$381.9 million**. Again, this incorporates the use of an expenditure multiplier of 1.5. Together then, these two revenue streams added about **$2.1 billion** to provincial coffers in 1998.

Job Creation:

This study provides estimates of job creation from the incremental earnings and expenditures of university graduates as summarized in Table EP-Three. The expenditures are powerful economic engines. In fact, the jobs created or sustained each year as a result of the *incremental* expenditures of all university graduates is greater than the number of jobs created or sustained each year as a result of the expenditures of the university system itself.

All University Degree Holders: Taking the entire bachelor, masters or doctorate degree holding group as a whole, we calculated the number of jobs that are sustained by the additional spending power of this group in a single year—1998. Given an additional $6,838.00 in market expenditures (per person) for bachelor degree holders and $7,659.00 for masters and doctorate degree holders resulting from the higher earnings of this group, the total *additional* market transactions can be estimated. This was done by multiplying the additional market transaction value by the number of degree holders in each group who are presumably spending these funds on an annual basis. The total additional market transactions can be estimated at approximately $4.96 billion for bachelor degree holders and $1.82 billion for the masters and doctorate group. Note that this estimate has been adjusted by the assumption that 30 per cent of these expenditures will ultimately "leak" out of the provincial economy or, for other reasons, would not result in job creation. Assuming that these expenditures translate into jobs at the rate of 25 person-years of employment per million of expenditure[45], the total number of jobs sustained directly or indirectly by the additional expenditures is 169,425 person-years (See Appendix A: Table A-D Seven).

Single Year Cohort: The additional expenditures of a single year's cohort of degree holders are approximately $455.5 million. This is determined by multiplying $6,838.00 and $7,659.00 by a one-year cohort of 54,747 and 10,597 persons (bachelor and masters/doctorate degree holders respectively). Based on the assumption that these expenditures translate into jobs at the rate of 25 person-years of employment per million of expenditure, the jobs sustained in 1998 by the additional direct and indirect expenditures of a single year cohort were **11,389** (See Appendix A: Table A-D Seven).

[45] This value is the average employment (in person-years) of other industry sectors in 1992 as referenced by Kubursi. This value was retained for the purposes of 1998 analysis to maintain as much comparability as possible to the original Kubursi model. Note that Table IP-Four illustrates the wide range of employment estimators depending on the industry under consideration.

Table EP-Three: A Summary of Job Creation Impacts from Incremental Spending

Summary of Impacts	**Job Creation**		
1998 From All Years	*Direct*	*Indirect*	*Total*
Bachelor Degree Holders	82,616	41,308	123,924
Masters & Doctorate Degree Holders	30,334	15,167	45,501
Total 1998 From All Years	**112,950**	**56,475**	**169,425**
1998 From One Year Cohort			
Bachelor Degree Holders	6,240	3,120	9,360
Masters & Doctorate Degree Holders	1,352	676	2,029
Total 1998 From One Year Cohort	**7,592**	**3,796**	**11,389**

The Philanthropic Premium:
$347 Million Per Year In Additional Donations by University Graduates

Virtually every analyst who has ever tackled the estimation of economic and social impact of universities acknowledges that capturing economic impacts is, at best, an incomplete assessment of the full 'return' that society receives from its investment in higher education. The nature of a university's contribution to society goes well beyond that which can easily be counted, valued and tallied. A full accounting would include contributions to the arts, cultural events and activities, informal advice and information offered to community groups and individuals by faculty, staff and graduates, and community use of university facilities—from art galleries to athletic facilities.

In this economic impact analysis, we have attempted to quantify two of the impacts of universities for which a reasonable effort at quantification may be made. While research studies have found evidence that attending university changes student values[46], relatively few studies have addressed the question of whether or not these value changes are sustained after graduation and whether these changes show up in changed behaviour. Philanthropic giving and volunteerism appear to be areas in which the available evidence can be deployed in a calculation to assess the economic value—if any—of these contributions.

Philanthropic Premium: How We Came Up With the Numbers

Based on data from the 1997 National Survey on Giving, Volunteering and Participating (NSGVP), we compared the philanthropic giving (donations to charitable organizations and causes) of university graduates with high school graduates. This calculation is not intended to make any value judgement about high school graduate giving *per se*. Rather, we used high school graduate giving as the benchmark to determine whether university graduates give more, less or about the same to charitable causes that would be the case if they had *not* continued on with their education. The high school graduate group was chosen as the comparator in this situation because we assumed that the university degree holding group would have had the same giving profile as high school graduates if they had not continued with higher education.

The NSGVP information revealed that university graduates are more likely to give than are high school graduates. In addition, each university graduate tends to donate more than his/her high school graduate counterpart. Based on these findings, we calculated the "philanthropic premium" associated with a university graduate. In other words, we calculated the value of *additional* donations that accrue to charitable organizations as a result of citizens pursuing a university degree.

[46] See How College Affects Students. Findings and Insights from Twenty Years of Research. By Ernst T. Pascarella and Patrick T. Terenzini. Jossey-Bass Publishers. San Francisco, 1991.

The details of the calculation of the philanthropic premium are set out in Appendix A: Table A-E One. The average annual (1997) philanthropic giving for an Ontario university graduate is $531.00 compared to $239.00 for a high school graduate. This data was adjusted by the Consumer Price Index to produce an estimated value for 1998. The participation rate for university graduates is 92 per cent compared to 77 per cent for high school graduates. The philanthropic premium was determined by taking the *difference* between the giving of the university graduate group and the giving of this group if their giving behaviour was the same as that of high school graduates. The first part of the calculation is the total number of university graduates in Ontario (estimated for 1998 based on Statistics Canada data) times the average annual donation of this group times the participation rate of university graduates. The second part of the calculation is the total number of university graduates in Ontario times the average annual donation of high school graduates times the participation rate of university graduates. The *difference* between these two values (the philanthropic premium) is **$420.1 million** in 1998.

Concluding Comments:

The argument can be made that without the investment in university education (which appears to be linked to additional donations to charitable causes), organizations which benefit from these contributions would be compelled to turn to government for at least some of the funds which are now provided by individuals.

Just how extensive the cost avoidance impact is for the Ontario government is a debatable point. Just over half of these donations are made to religious organizations (51 per cent), some portion of which would be dedicated to good works within Ontario communities. Health organizations receive the second largest share of donations (19 per cent). Social service organizations receive 11 per cent of donations, and education and research organizations receive six per cent of donations. Culture, arts and recreation organizations receive four per cent of donations. It would seem reasonable to assume that half or more of the philanthropic premium is going to sectors that would fall largely (if not entirely) under the provincial government's mandate. This would mean that a cost avoidance benefit valued at approximately $210 million per year (50 per cent of $420.1 million) would accrue to the Province of Ontario as a result of university graduates' philanthropic behaviour.

Even if the logic of the philanthropic premium calculation is accepted, we acknowledge that this premium is the result of many years of public and private investment in universities, which has created a large pool of civic-minded individuals with the financial wherewithal and the personal motivation to make these contributions. Therefore, it would be inappropriate to consider the philanthropic premium as a payback for just one year's investment in universities. However, we ought to at least acknowledge that on an annual basis, society receives a significant tangible economic benefit from its long-term commitment to investing in universities.

The Volunteerism Premium:
University Graduates Give $147 Million Per Year In Additional Volunteer Hours

In addition to calculating the direct financial impact on society as a result of university graduates' charitable giving behaviour, we also estimated the indirect impact which might result from differences in contributing volunteer time. This calculation was intended to quantify the impact (if any) of university education on willingness to contribute (unpaid) time to civic activity.

The Volunteerism Premium: How We Came Up With The Number

Based on data from the 1997 National Survey on Giving, Volunteering and Participating, we compared the volunteerism of university graduates with high school graduates (See Appendix A: Table A-E Two). As with the calculation of the philanthropic premium, the calculation of a volunteerism premium is not intended to make any value judgement about high school graduate contributions of volunteer time *per se*. Rather, we used volunteerism by high school graduates as the benchmark to determine whether university graduates give more, less or about the same amount of time to (unpaid) civic work as would be the case if they had *not* continued on with their education. We assumed that the university degree holding group would have had the same volunteerism profile as high school graduates if they had not continued with higher education.

Because the NSGVP data is from 1997, we were required to make an assumption about what change, if any, might have taken place between 1997 and 1998 in the volunteerism profile of each of the two groups. In the absence of any evidence which would provide the basis for an assumption of change, we assumed that the volunteerism profile for the two groups would not have changed significantly between 1997 and 1998. In other words, the amount of time each group would have given to civic work was assumed to be the same in 1998 as it would have been in 1997. Therefore, 1997 data was considered reflective of 1998 experience.

Data from the NSGVP study revealed that while the total number of volunteer hours per year for an individual university graduate are less than for a high school graduate (139 compared to 177), the participation rate for university graduates is higher (49 per cent compared to 29 per cent for high school graduates). Therefore, when we calculate the total number of volunteer hours for the university graduate group and compare it to the total number of volunteer hours that would be contributed if this group volunteered as high school graduates do, we find that the total number of volunteer hours is still greater for the university graduate group.

The final step in the calculation was to assign a modest economic value to the *additional* hours of voluntary activity contributed by university graduates as a group. We assigned a minimal economic value (Ontario minimum wage: $6.85 per hour) to the total number of *additional* hours contributed by the university graduate group in a single year. This yields a societal economic value estimate of **$146.8 million** for 1998.

Concluding Comments:

As with the calculation of the philanthropic premium, the argument can be made that if university graduates were not contributing these extra volunteer hours, the financial pressure on governments would increase. For example, charitable organizations might be compelled to hire additional full-time staff or reduce services, which could transfer service demand to other public sector organizations. Some of this service stress could translate into requests for additional funding from the province.

The types of organizations that most benefit from volunteer work are recreational and social clubs (31 per cent of all volunteer hours), social service organizations (20 per cent), religious organizations (15 per cent), health organizations (14 per cent) and education and research organizations (4 per cent). The "other" category receives 16 per cent of volunteer hours.

It would seem reasonable to assume that half or more of the volunteer premium is going to sectors that would fall largely (if not entirely) under the provincial government's mandate. This would mean that a *maximum* cost avoidance benefit valued at $73 million per year (50 per cent of $146.8 million) would accrue to the Province of Ontario as a result of university graduates' volunteerism.

Technical Appendices

Table A-A One:
Expenditures by Ontario University System (1998)

Table A-A Two:
Calculation of New Multipliers for Economic Impact of Institutional Expenditures (1998)

Table A-A Three:
Economic Impacts For Individual Institutions (1998)

Table A-B One:
Economic Impact of Out of Province Students (1998)

Table A-C One:
Economic Impact from Innovation – Spin-off (1998)

Table A-C Two:
Economic Impact from Innovation – Consulting Activity (1998)

Table A-D One and Two:
Mean Employment Income for Individuals Completing High School and Holders of Bachelor and First Professional Degree Graduates, Full-Time and Part-Time Workers, Ontario 1995

Table A-D Three:
Three: Income Tax Paid by Individuals Completing High School and Holders of Bachelor and First Degree Graduates, Full-Time and Part-Time Workers, Ontario 1995

Table A-D Four:
Incremental Provincial Sales Tax and Expenditures in Ontario Economy (1998)

Table A-D Five: Calculation of Incremental Income Tax and Provincial Sales Tax For Single Year Cohort and Entire Bachelor's Degree Holder Group

Table A-E One:
Philanthropic Premium Due To Higher Earnings of University Degree Holders (1998)

Table A-E Two:
Volunteerism Premium Due To University Degree Holder Contributions

Table A-A-One: Expenditures by Ontario University System (1998)

Total University Expenses (By Object) For the Fiscal Year Ended April 30, 1999			
	General Expendable Funds	Restricted Expendable Funds	Total
Salaries and Wages	*$ 2,072,084,000.00*	*$ 458,852,000.00*	*$ 2,530,936,000.00*
Employee Benefits	$ 276,405,000.00	$ 44,308,000.00	$ 320,713,000.00
Total Salaries and Benefits	$ 2,348,489,000.00	$ 503,160,000.00	*$ 2,851,649,000.00*
Library Acquisitions	$ 81,806,000.00	$ 14,488,000.00	$ 96,294,000.00
Equipment and Furniture Purchase, Rental & Maint.	$ 167,008,000.00	$ 100,139,000.00	$ 267,147,000.00
Operational Supplies and Expenses	$ 521,597,000.00	$ 280,762,000.00	$ 802,359,000.00
Travel	$ 48,322,000.00	$ 65,126,000.00	$ 113,448,000.00
Utilities	$ 116,188,000.00	$ 1,760,000.00	$ 117,948,000.00
Renovations and Alterations	$ 37,046,000.00	$ 60,712,000.00	$ 97,758,000.00
Externally Contracted Services	$ 77,465,000.00	$ 8,534,000.00	$ 85,999,000.00
Scholarships, Bursaries etc.	$ 132,618,000.00	$ 36,708,000.00	$ 169,326,000.00
Principal and Interest Payments	$ 68,267,000.00	$ 7,299,000.00	$ 75,566,000.00
Building, Land and Site Services	$ 18,699,000.00	$ 69,247,000.00	$ 87,946,000.00
Internal Cost Allocations	$ (14,764,000.00)	$ 14,764,000.00	$ -
External Cost Recoveries	$ (69,873,000.00)	$ (11,034,000.00)	$ (80,907,000.00)
Total Initial Institutional Expenditures	***$ 3,532,868,000.00***	***$ 1,151,665,000.00***	***$ 4,684,533,000.00***

Table A-A-Two: Calculation of New Multipliers for Economic Impact of Institutional Expenditures (1998)

	General Funds	Restricted Funds	Total
Initial Expenditures	***$ 3,532,868,000.00***	***$ 1,151,665,000.00***	***$ 4,684,533,000.00***
Gross Output			
Total Impact	$ 8,019,610,360.00	$ 2,925,229,100.00	$ 10,944,839,460.00
Initial Impact	$ 1,018,490,515.72	$ 783,961,398.80	$ 1,802,451,914.52
Indirect and Induced Impact	$ 7,001,119,844.28	$ 2,141,267,701.20	$ 9,142,387,545.48
Multiplier (unscaled)	2.01	2.12	
Multiplier (scaled)	2.27	2.54	2.34
Gross Domestic Product			
Total Impact	$ 7,277,708,080.00	$ 2,798,545,950.00	$ 10,076,254,030.00
Initial Impact	$ 2,678,196,573.44	$ 931,915,801.35	$ 3,610,112,374.79
Indirect and Induced Impact	$ 4,599,511,506.56	$ 1,866,630,148.65	$ 6,466,141,655.21
Multiplier (unscaled)	2.34	2.06	
Multiplier (scaled)	2.06	2.43	2.15
Labour Income			
Total Impact	$ 4,987,703,042.40	$ 1,295,392,792.00	$ 6,283,095,834.40
Initial Impact	$ 2,264,417,181.25	$ 518,157,116.80	$ 2,782,574,298.05
Indirect and Induced Impact	$ 2,723,285,861.15	$ 777,235,675.20	$ 3,500,521,536.35
Multiplier	1.4118	1.1248	
Employment (in person-years)			
Total Impact	148,211	48,315	196,526
Initial Impact	80,114	24,157	104,535
Indirect and Induced Impact	68,097	24,157	91,991
Multiplier	1.85	2.00	1.88
Taxes (Total)			
Total	$ 2,205,145,548.24	$ 833,966,693.10	$ 3,039,112,241.34
Provincial	$ 557,901,823.70	$ 213,495,473.43	$ 771,397,297.14
Federal	$ 1,519,345,282.74	$ 574,603,051.55	$ 2,093,948,334.28
Municipal	$ 127,898,441.80	$ 45,868,168.12	$ 173,766,609.92
Imports			
Total	$ 2,020,941,810.72	$ 781,036,169.70	$ 2,801,977,980.42
From Other Countries	$ 990,261,487.25	$ 460,811,340.12	$ 1,451,072,827.38
From Other Provinces	$ 1,030,680,323.47	$ 320,224,829.58	$ 1,350,905,153.04

Note: the scaled multipliers shown above are the original Kubursi multipliers adjusted to reflect the change in the proportions of expenditures which are wage and salary in nature and those which are goods and materials. The assumption made in this study is that any dollar expended on wages and salaries will have the same impact (multiplier effect) today as it would have in 1992. Similarly, any dollar spent on goods and materials will have the same impact as it would have in 1992. However, Kubursi's work indicates that these impacts are not equivalent. Therefore, if the relative proportions of university funds spent on each type of expenditure changes, the combined effect of all these expenditures will change. We have reflected this change by adding using a weighting factor with each multiplier to adjust for the change in internal distribution of expenditures (less on wages and salaries, more on goods and materials).

For example, the scaled multiplier for General Funds Gross Output has been calculated by multiplying the unscaled (1992) multiplier by the ratio of the 1992 percentage of goods and materials to the 1998 percentage of goods and materials (1992/1998). Because the 1992 percentage is higher, the ratio is greater than one and has the effect of increasing the multiplier proportionately. The Gross Output values are therefore increased. The underlying structure of the Canadian economy may not have changed but the Gross Output of the university sector has changed because its use of various sectors (goods and materials versus labour) has shifted since 1992. The same approach has been used for the GDP, labour income and employment multipliers.

Table A-A Three-Part One: The Economic Impact of Individual Universities (1998)

	Brock	Carleton	Guelph	Lakehead	Laurentian	McMaster	Nipissing	Ontario College of Art	Ottawa
Initial Expenditures	$ 94,556	$ 196,612	$308,958	$ 72,320	$ 89,657	$ 338,056	$ 20,855	$ 16,288	$ 348,011
Gross output									
Total Impact	$220,165	$460,048	$726,468	$169,220	$208,758	$794,888	$49,516	$37,365	$806,321
Initial	$44,953	$89,785	$128,080	$32,457	$38,562	$169,722	$9,428	$6,291	$138,854
Indirect and Induced	$175,212	$370,263	$598,388	$136,763	$170,196	$625,166	$40,088	$31,074	$667,467
Multiplier (1998)	2.33	2.34	2.35	2.34	2.33	2.35	2.37	2.29	2.32
Multiplier (1992)	2.03	2.04	2.05	2.04	2.03	2.05	2.07	2.00	2.02
Gross Domestic Product									
Total Impact	$204,162	$422,655	$667,090	$154,781	$190,188	$723,514	$44,239	$36,402	$758,003
Initial	$73,498	$185,968	$240,152	$55,721	$68,468	$260,465	$15,705	$13,396	$275,155
Indirect and Induced	$130,663	$236,687	$426,937	$99,060	$121,720	$463,049	$28,534	$23,006	$482,848
Multiplier (1998)	2.16	2.15	2.16	2.14	2.12	2.14	2.12	2.23	2.18
Multiplier (1992)	2.28	2.27	2.28	2.26	2.24	2.26	2.24	2.36	2.30
Labour Income									
Salaries	$ 49,603	$ 106,827	$180,878	$ 39,863	$ 51,095	$ 168,334	$ 11,427	$ 9,997	$ 209,157
Percentage of total exp.	52.46	54.33	58.54	55.12	56.99	49.79	54.79	61.38	60.10
Total Impact	$164,621	$340,558	$535,155	$126,325	$156,529	$581,394	$36,017	$28,036	$605,714
Initial	$73,092	$150,526	$236,004	$55,709	$69,186	$255,813	$15,632	$12,813	$271,360
Indirect and Induced	$91,529	$190,031	$299,152	$70,616	$87,343	$325,580	$20,386	$15,224	$334,354
Employment (Person Yrs)									
Total Impact	4189	8710	13687	3204	3972	14976	924	722	15417
Initial	2340	4892	7688	1781	2207	8457	522	416	8945
Indirect and Induced	1848	3818	5999	1423	1764	6519	402	305	6472
Multiplier (1998)	1.79	1.78	1.78	1.80	1.80	1.77	1.77	1.73	1.72
Multiplier (1992)	1.89	1.88	1.88	1.90	1.90	1.87	1.87	1.83	1.82

Table A-A Three-Part Two: The Economic Impact of Individual Universities (1998)

	Queen's	Ryerson	Toronto	Trent	Waterloo	Western	Windsor	Wilfred Laurier	York	TOTAL
Initial Expenditures	$390,609	$166,275	$ 1,137,925	$ 58,501	$ 314,380	$ 501,049	$ 138,838	$ 92,476	$ 398,104	$ 4,683,470
Gross output										
Total Impact	$913,978	$390,971	$2,649,556	$137,556	$735,611	$1,178,142	$321,679	$216,383	$922,383	$10,958,758
Initial	$191,269	$74,905	$534,414	$25,377	$147,329	$250,441	$63,578	$44,706	$162,961	$2,153,112
Indirect and Induced	$722,709	$316,066	$2,115,142	$112,179	$588,282	$927,701	$258,101	$171,677	$759,422	$8,785,897
Multiplier (1998)	2.34	2.35	2.33	2.35	2.34	2.35	2.32	2.34	2.32	2.34
Multiplier (1992)	2.04	2.05	2.03	2.05	2.04	2.05	2.02	2.04	2.02	2.04
Gross Domestic Product										
Total Impact	$839,688	$343,268	$2,478,514	$124,097	$678,797	$1,077,100	$298,459	$197,043	$852,030	$10,631,477
Initial	$302,288	$122,547	$1,172,337	$45,171	$245,046	$387,756	$108,042	$70,541	$307,583	$3,949,839
Indirect and Induced	$537,400	$220,721	$1,306,177	$78,926	$433,751	$689,344	$190,417	$126,502	$544,447	$6,140,190
Multiplier (1998)	2.15	2.06	2.18	2.12	2.16	2.15	2.15	2.13	2.14	2.15
Multiplier (1992)	2.27	2.18	2.30	2.24	2.28	2.27	2.27	2.25	2.26	2.27
Labour Income										
Salaries	$199,340	$ 91,370	$ 603,511	$ 33,124	$ 167,051	$ 250,608	$ 75,260	$ 47,770	$ 235,143	$ 2,530,936
Percentage of total exp.	51.03	54.95	53.04	56.62	53.14	50.02	54.21	51.66	59.07	54.04
Total Impact	$675,738	$273,499	$1,966,850	$99,932	$540,703	$873,875	$243,019	$161,758	$678,545	$8,088,268
Initial	$298,676	$117,058	$877,215	$44,570	$240,613	$385,379	$108,144	$71,173	$310,095	$3,593,056
Indirect and Induced	$377,062	$156,441	$1,089,635	$55,362	$300,090	$488,496	$134,876	$90,584	$368,450	$4,495,212
Employment (Person Yrs)										
Total Impact	17304	7366	50410	2592	13927	22196	6151	4097	17636	207478
Initial	9824	4159	27439	1471	7740	12601	3418	2289	9802	115992
Indirect and Induced	7480	3207	22971	1120	6187	9595	2732	1808	7834	91486
Multiplier (1998)	1.76	1.77	1.84	1.76	1.80	1.76	1.80	1.79	1.80	1.78
Multiplier (1992)	1.86	1.87	1.94	1.86	1.90	1.86	1.90	1.89	1.90	1.88

Table A-B-One: Economic Impact of Out of Province Students (1998)

Expenditures by Out-of-Province Students	Direct	Multiplier
Number of Full-time Students - Undergraduate	23,314	
Number of Part-Time Students - Undergraduate	1,412	
Total - Undergraduate Students	24,726	
Average annual living expenses	$ 6,911	
Discount for savings at rate of 5 per cent	$ 346	
Net annual living expenses reflected in purchases of goods and services	$ 6,565	
Total annual living expenses	$ 162,337,316.70	$ 324,674,633.40
PST on purchases (assuming 45.9 per cent of purchases are subject to PST)	**$ 6,090,896.12**	**$ 11,922,052.54**
Number of Full-Time Students - Graduate	1,328	
Number of Part-Time Students - Graduate	664	
Total - Graduate Students	1,992	
Average annual living expenses	11,000	
Discount for savings at 5 per cent	$ 550	
Net annual living expenses reflected in purchases of goods and services	$ 10,450	
Total annual living expenses	$ 20,816,400.00	$ 41,632,800.00
PST on purchases (assuming 45.9 per cent of purchases are subject to PST)	**764,378.21**	**$ 1,528,756.42**
Total PST from undergraduate and graduate students combined	**$ 6,855,274.33**	**$ 13,450,808.95**
Total expenditures (undergraduate and graduate) less PST	$ 176,298,422.37	$ 352,856,624.45
Job Creation (in person-years or full-time equivalents)	4,407	8,821

Table A-C One: Economic Impact from Innovation (Due to Research and Development Activity at Universities)

Spin-off Companies	Canada	Ontario	Direct Impact	Indirect Impact	Total Impact
1998 Spin-offs	58	22			
Annual Sales/Spin-off	$ 9,112,149.00	$ 9,112,149.00			
Total Sales - Per Year		$196,603,726.82			
Share of Sales - Labour		$115,996,198.83			
Wages and Salaries per employee		$ 74,539.59			
Less Allowance for Taxes - Per Person		$ 15,931.56			
Total Taxes to Federal Government		$ 19,833,759.83			
Province Income Taxes		$ 8,478,932.33	$ 8,478,932.33		$ 8,478,932.33
Expenditures in Ontario Economy from Direct Employment		$ 93,111,525.02			
Provincial Sales Tax Generated @ 0.08		$ 7,448,922.00	$ 7,448,922.00	$7,448,922.00	$ 14,897,844.00
Share of Sales - Cost of Goods Sold		$ 80,607,528.00			
Less Leakage Allowance of 25 per cent		$ 20,151,882.00			
Net Cost of Goods Purchased		$ 60,455,646.00			
Provincial Sales Tax Generated @ 0.08		$ 4,836,451.68	$ 4,836,451.68	$4,836,451.68	$ 9,672,903.36
Jobs/Spin-off	57.7				
Job Creation from Spin-offs		1245	1245	909	2,154
Pre-Production Investment					
Activity generated by licensing		$196,603,726.82			
Pre-production expenditures		$ 39,320,745.36			
Share of Expenditures - Labour		$ 23,592,447.22			
Total Taxes to Federal Government		$ 4,033,985.05			
Province Income Taxes		**$ 1,724,528.61**	$ 1,724,528.61		$ 1,724,528.61
Expenditures in Ontario Economy from Pre-production employment		$ 13,966,728.75			
Less Leakage Allowance of 25 per cent		$ 3,491,682.19			
Net Expenditures in Ontario economy		$ 10,475,046.57			
Provincial Sales Tax Generated @ 0.08		**$ 838,003.73**	$ 838,003.73	$ 838,003.73	$ 1,676,007.45
Share of Sales - Cost of Goods Sold		$ 15,728,298.15			
Less Leakage Allowance of 25 per cent		$ 3,932,074.54			
Net Cost of Goods Purchased		$ 11,796,223.61			
Provincial Sales Tax Generated @ 0.08		**$ 943,697.89**	$ 943,697.89	$ 943,697.89	$ 1,887,395.78

Table A-C Two: Economic Impact from Innovation (Due to Research and Development Activity at Universities)

	Canada	Ontario	Direct Impact	Indirect Impact	Total Impact
Consulting Activity					
Annual Licensing Revenues - Canadian Universities	$ 11,300,000.00				
Annual Licensing Revenues - Ontario Universities		$ 4,294,000.00			
Annual Consulting Revenues - Ontario Universities		$ 4,294,000.00			
Share of Consulting Revenues - Labour		$ 3,005,800.00			
Less Allowance for Taxes		$ 513,950.59			
Provincial Income Taxes		**$ 195,301.23**	$ 195,301.23		$ 195,301.23
Expenditures in Economy from Consulting Employment		$ 500,165.12			
Provincial Sales Tax Generated @ 0.08		**$ 40,013.21**	$ 40,013.21	$ 40,013.21	$ 80,026.42
Share of Sales - Cost of Goods Sold		$ 1,288,200.00			
Less Leakage Allowance of 25 per cent		$ 322,050.00			
Net Cost of Goods Purchased		$ 966,150.00			
Provincial Sales Tax Generated @ 0.08		**$ 77,292.00**	$ 77,292.00	$ 77,292.00	$ 154,584.00
Job Creation Associated with Consulting Activity		96.96	96.96	167.74	264.70
Total Provincial Income Tax Revenues			$ 10,398,762.16	$ -	$ 10,398,762.16
Total Provincial Sales Tax Revenues			$ 14,184,380.51	$ 14,184,380.51	$ 28,368,761.01
			$ 24,583,142.67	$ 14,184,380.51	$ 38,767,523.17
Total Job Creation - All Components			1341.90	1076.55	2418.44

Table A-D One: Mean Employment Income for Individuals Completing High School and Holders of Bachelor and First Professional Degree Graduates, Full-Time and Part-Time Workers, Ontario 1995 (Statistics Canada 1996 population census)

	Males	Males	Females	Females
Age	High School	Bachelor Degree	High School	Bachelor Degree
17	$ 5,328.00	$ 1,332.00	$ 4,485.00	$ 1,121.25
18	$ 5,328.00	$ 1,332.00	$ 4,485.00	$ 1,121.25
19	$ 5,328.00	$ 1,332.00	$ 4,485.00	$ 1,121.25
20	$ 12,371.00	$ 3,092.75	$ 8,463.00	$ 2,115.75
21	$ 12,371.00	$ 3,092.75	$ 8,463.00	$ 2,115.75
22	$ 12,371.00	$ 18,000.00	$ 8,463.00	$ 16,000.00
23	$ 12,371.00	$ 21,500.00	$ 8,463.00	$ 19,500.00
24	$ 12,371.00	$ 24,000.00	$ 8,463.00	$ 22,000.00
25	$ 24,374.00	$ 28,126.00	$ 18,024.00	$ 24,350.00
26	$ 24,374.00	$ 28,126.00	$ 18,024.00	$ 24,350.00
27	$ 24,374.00	$ 28,126.00	$ 18,024.00	$ 24,350.00
28	$ 24,374.00	$ 28,126.00	$ 18,024.00	$ 24,350.00
29	$ 24,374.00	$ 28,126.00	$ 18,024.00	$ 24,350.00
30	$ 31,446.00	$ 44,736.00	$ 20,554.00	$ 32,908.00
31	$ 31,446.00	$ 44,736.00	$ 20,554.00	$ 32,908.00
32	$ 31,446.00	$ 44,736.00	$ 20,554.00	$ 32,908.00
33	$ 31,446.00	$ 44,736.00	$ 20,554.00	$ 32,908.00
34	$ 31,446.00	$ 44,736.00	$ 20,554.00	$ 32,908.00
35	$ 36,319.00	$ 55,883.00	$ 29,636.00	$ 36,359.00
36	$ 36,319.00	$ 55,883.00	$ 29,636.00	$ 36,359.00
37	$ 36,319.00	$ 55,883.00	$ 29,636.00	$ 36,359.00
38	$ 36,319.00	$ 55,883.00	$ 29,636.00	$ 36,359.00
39	$ 36,319.00	$ 55,883.00	$ 29,636.00	$ 36,359.00
40	$ 40,128.00	$ 59,623.00	$ 24,448.00	$ 38,081.00
41	$ 40,128.00	$ 59,623.00	$ 24,448.00	$ 38,081.00
42	$ 40,128.00	$ 59,623.00	$ 24,448.00	$ 38,081.00
43	$ 40,128.00	$ 59,623.00	$ 24,448.00	$ 38,081.00
44	$ 40,128.00	$ 59,623.00	$ 24,448.00	$ 38,081.00
45	$ 43,241.00	$ 63,150.00	$ 25,444.00	$ 41,618.00
46	$ 43,241.00	$ 63,150.00	$ 25,444.00	$ 41,618.00
47	$ 43,241.00	$ 63,150.00	$ 25,444.00	$ 41,618.00
48	$ 43,241.00	$ 63,150.00	$ 25,444.00	$ 41,618.00
49	$ 43,241.00	$ 63,150.00	$ 25,444.00	$ 41,618.00
50	$ 45,218.00	$ 65,907.00	$ 25,239.00	$ 41,377.00
51	$ 45,218.00	$ 65,907.00	$ 25,239.00	$ 41,377.00
52	$ 45,218.00	$ 65,907.00	$ 25,239.00	$ 41,377.00
53	$ 45,218.00	$ 65,907.00	$ 25,239.00	$ 41,377.00
54	$ 45,218.00	$ 65,907.00	$ 25,239.00	$ 41,377.00
55	$ 43,388.00	$ 63,529.00	$ 23,183.00	$ 35,932.00
56	$ 43,388.00	$ 63,529.00	$ 23,183.00	$ 35,932.00
57	$ 43,388.00	$ 63,529.00	$ 23,183.00	$ 35,932.00
58	$ 43,388.00	$ 63,529.00	$ 23,183.00	$ 35,932.00
59	$ 43,388.00	$ 63,529.00	$ 23,183.00	$ 35,932.00
60	$ 37,420.00	$ 58,219.00	$ 21,091.00	$ 30,793.00
61	$ 37,420.00	$ 58,219.00	$ 21,091.00	$ 30,793.00
62	$ 37,420.00	$ 58,219.00	$ 21,091.00	$ 30,793.00
63	$ 37,420.00	$ 58,219.00	$ 21,091.00	$ 30,793.00
64	$ 37,420.00	$ 58,219.00	$ 21,091.00	$ 30,793.00
Total	$1,585,509.00	$ 2,269,546.50	$993,865.00	$ 1,472,185.25

Table A-D-Two: Mean Employment Income for Individuals Completing High School and Holders of Bachelor and First Professional Degree Graduates, Full-Time and Part-Time Workers, Ontario 1995

Age	Weighted Average High School without HEI adjust.	Weighted Average Bachelor Degree without HEI adjust.	Weighted Average High School with HEI adjust.	Weighted Average Bachelor Degree with HEI adjust.	Bachelor Degree Discounted (Weighted Average)
17	$ 4,886.268	$ 1,220.513	$ 5,262.511	$ 1,314.493	$ 1,156.75
18	$ 4,886.268	$ 1,220.513	$ 5,262.511	$ 1,314.493	$ 1,156.75
19	$ 4,886.268	$ 1,220.513	$ 5,262.511	$ 1,314.493	$ 1,156.75
20	$ 10,346.656	$ 2,583.733	$ 11,143.349	$ 2,782.680	$ 2,448.76
21	$ 10,346.656	$ 2,583.733	$ 11,143.349	$ 2,782.680	$ 2,448.76
22	$ 10,346.656	$ 16,958.000	$ 1,143.349	$ 18,263.766	$ 16,072.11
23	$ 10,346.656	$ 20,458.000	$ 11,143.349	$ 22,033.266	$ 19,389.27
24	$ 10,346.656	$ 22,958.000	$ 11,143.349	$ 24,725.766	$ 21,758.67
25	$ 21,084.700	$ 26,158.704	$ 22,708.222	$ 28,172.924	$ 24,792.17
26	$ 21,084.700	$ 26,158.704	$ 22,708.222	$ 28,172.924	$ 24,792.17
27	$ 21,084.700	$ 26,158.704	$ 22,708.222	$ 28,172.924	$ 24,792.17
28	$ 21,084.700	$ 26,158.704	$ 22,708.222	$ 28,172.924	$ 24,792.17
29	$ 21,084.700	$ 26,158.704	$ 22,708.222	$ 28,172.924	$ 24,792.17
30	$ 25,803.944	$ 38,573.612	$ 27,790.848	$ 41,543.780	$ 36,558.53
31	$ 25,803.944	$ 38,573.612	$ 27,790.848	$ 41,543.780	$ 36,558.53
32	$ 25,803.944	$ 38,573.612	$ 27,790.848	$ 41,543.780	$ 36,558.53
33	$ 25,803.944	$ 38,573.612	$ 27,790.848	$ 41,543.780	$ 36,558.53
34	$ 25,803.944	$ 38,573.612	$ 27,790.848	$ 41,543.780	$ 36,558.53
35	$ 32,857.206	$ 45,710.996	$ 35,387.211	$ 49,230.743	$ 43,323.05
36	$ 32,857.206	$ 45,710.996	$ 35,387.211	$ 49,230.743	$ 43,323.05
37	$ 32,857.206	$ 45,710.996	$ 35,387.211	$ 49,230.743	$ 43,323.05
38	$ 32,857.206	$ 45,710.996	$ 35,387.211	$ 49,230.743	$ 43,323.05
39	$ 32,857.206	$ 45,710.996	$ 35,387.211	$ 49,230.743	$ 43,323.05
40	$ 32,005.760	$ 48,399.618	$ 34,470.204	$ 52,126.389	$ 45,871.22
41	$ 32,005.760	$ 48,399.618	$ 34,470.204	$ 52,126.389	$ 45,871.22
42	$ 32,005.760	$ 48,399.618	$ 34,470.204	$ 52,126.389	$ 45,871.22
43	$ 32,005.760	$ 48,399.618	$ 34,470.204	$ 52,126.389	$ 45,871.22
44	$ 32,005.760	$ 48,399.618	$ 34,470.204	$ 52,126.389	$ 45,871.22
45	$ 34,022.154	$ 56,181.676	$ 36,641.860	$ 60,507.665	$ 53,246.75
46	$ 32,811.958	$ 56,181.676	$ 35,338.479	$ 60,507.665	$ 53,246.75
47	$ 32,811.958	$ 56,181.676	$ 35,338.479	$ 60,507.665	$ 53,246.75
48	$ 32,811.958	$ 56,181.676	$ 35,338.479	$ 60,507.665	$ 53,246.75
49	$ 32,811.958	$ 56,181.676	$ 35,338.479	$ 60,507.665	$ 53,246.75
50	$ 33,510.306	$ 57,642.518	$ 36,090.600	$ 62,080.992	$ 54,631.27
51	$ 33,510.306	$ 57,642.518	$ 36,090.600	$ 62,080.992	$ 54,631.27
52	$ 33,510.306	$ 57,642.518	$ 36,090.600	$ 62,080.992	$ 54,631.27
53	$ 33,510.306	$ 57,642.518	$ 36,090.600	$ 62,080.992	$ 54,631.27
54	$ 33,510.306	$ 57,642.518	$ 36,090.600	$ 62,080.992	$ 54,631.27
55	$ 31,547.870	$ 53,657.812	$ 33,977.056	$ 57,789.464	$ 50,854.73
56	$ 31,547.870	$ 53,657.812	$ 33,977.056	$ 57,789.464	$ 50,854.73
57	$ 31,547.870	$ 53,657.812	$ 33,977.056	$ 57,789.464	$ 50,854.73
58	$ 31,547.870	$ 53,657.812	$ 33,977.056	$ 57,789.464	$ 50,854.73
59	$ 31,547.870	$ 53,657.812	$ 33,977.056	$ 57,789.464	$ 50,854.73
60	$ 27,851.206	$ 48,143.494	$ 29,995.749	$ 51,850.543	$ 45,628.48
61	$ 27,851.206	$ 48,143.494	$ 29,995.749	$ 51,850.543	$ 45,628.48
62	$ 27,851.206	$ 48,143.494	$ 29,995.749	$ 51,850.543	$ 45,628.48
63	$ 27,851.206	$ 48,143.494	$ 29,995.749	$ 51,850.543	$ 45,628.48
64	$ 27,851.206	$ 48,143.494	$ 29,995.749	$ 51,850.543	$ 45,628.48
Total	$1,254,967.030	$1,941,545.156	$1,351,599.491	$ 2,091,044.133	$ 1,840,118.84

Table A-D Three: Income Tax Paid, 1995

Age	Income Taxes High School	Income Taxes Bachelor Degree	Annual Education Premium Unadjusted For Costs	Annual Education Premium Adjusted for Costs
17	$ -	$ -	$ (4,105.76)	$ (4,105.76)
18	$ -	$ -	$ (4,105.76)	$ (4,105.76)
19	$ -	$ -	$ (4,105.76)	$ (8,340.76)
20	$ 1,218.71	$ -	$ (7,475.88)	$ (11,710.88)
21	$ 1,218.71	$ -	$ (7,475.88)	$ (11,710.88)
22	$ 1,218.71	$ 2,500.19	$ 3,647.29	$ (587.71)
23	$ 1,218.71	$ 3,362.65	$ 6,101.98	$ 6,101.98
24	$ 1,218.71	$ 3,978.70	$ 7,855.34	$ 7,855.34
25	$ 4,225.58	$ 4,767.41	$ 1,542.12	$ 1,542.12
26	$ 4,225.58	$ 4,767.41	$ 1,542.12	$ 1,542.12
27	$ 4,225.58	$ 4,767.41	$ 1,542.12	$ 1,542.12
28	$ 4,225.58	$ 4,767.41	$ 1,542.12	$ 1,542.12
29	$ 4,225.58	$ 4,767.41	$ 1,542.12	$ 1,542.12
30	$ 5,547.06	$ 7,826.66	$ 6,488.08	$ 6,488.08
31	$ 5,547.06	$ 7,826.66	$ 6,488.08	$ 6,488.08
32	$ 5,547.06	$ 7,826.66	$ 6,488.08	$ 6,488.08
33	$ 5,547.06	$ 7,826.66	$ 6,488.08	$ 6,488.08
34	$ 5,547.06	$ 7,826.66	$ 6,488.08	$ 6,488.08
35	$ 7,522.11	$ 9,585.43	$ 5,872.52	$ 5,872.52
36	$ 7,522.11	$ 9,585.43	$ 5,872.52	$ 5,872.52
37	$ 7,522.11	$ 9,585.43	$ 5,872.52	$ 5,872.52
38	$ 7,522.11	$ 9,585.43	$ 5,872.52	$ 5,872.52
39	$ 7,522.11	$ 9,585.43	$ 5,872.52	$ 5,872.52
40	$ 7,283.69	$ 10,247.96	$ 8,436.75	$ 8,436.75
41	$ 7,283.69	$ 10,247.96	$ 8,436.75	$ 8,436.75
42	$ 7,283.69	$ 10,247.96	$ 8,436.75	$ 8,436.75
43	$ 7,283.69	$ 10,247.96	$ 8,436.75	$ 8,436.75
44	$ 7,283.69	$ 10,247.96	$ 8,436.75	$ 8,436.75
45	$ 7,848.32	$ 12,165.59	$ 12,287.62	$ 12,287.62
46	$ 7,509.44	$ 12,165.59	$ 13,252.12	$ 13,252.12
47	$ 7,509.44	$ 12,165.59	$ 13,252.12	$ 13,252.12
48	$ 7,509.44	$ 12,165.59	$ 13,252.12	$ 13,252.12
49	$ 7,509.44	$ 12,165.59	$ 13,252.12	$ 13,252.12
50	$ 7,705.00	$ 12,525.57	$ 13,720.10	$ 13,720.10
51	$ 7,705.00	$ 12,525.57	$ 13,720.10	$ 13,720.10
52	$ 7,705.00	$ 12,525.57	$ 13,720.10	$ 13,720.10
53	$ 7,705.00	$ 12,525.57	$ 13,720.10	$ 13,720.10
54	$ 7,705.00	$ 12,525.57	$ 13,720.10	$ 13,720.10
55	$ 7,155.47	$ 11,543.67	$ 12,489.48	$ 12,489.48
56	$ 7,155.47	$ 11,543.67	$ 12,489.48	$ 12,489.48
57	$ 7,155.47	$ 11,543.67	$ 12,489.48	$ 12,489.48
58	$ 7,155.47	$ 11,543.67	$ 12,489.48	$ 12,489.48
59	$ 7,155.47	$ 11,543.67	$ 12,489.48	$ 12,489.48
60	$ 6,120.33	$ 10,184.84	$ 11,568.22	$ 11,568.22
61	$ 6,120.33	$ 10,184.84	$ 11,568.22	$ 11,568.22
62	$ 6,120.33	$ 10,184.84	$ 11,568.22	$ 11,568.22
63	$ 6,120.33	$ 10,184.84	$ 11,568.22	$ 11,568.22
64	$ 6,120.33	$ 10,184.84	$ 11,568.22	$ 11,568.22
Total	$ 271,775.91	$ 404,077.20	$ 356,218.06	$ 339,278.06

Table A-D Four: Incremental Provincial Sales Tax and Expenditures (1998)

Age	Incremental PST To Province of Ontario	Incremental Expenditures In Ontario Economy
17	$ (97.55)	$ (2,571.26)
18	$ (97.55)	$ (2,571.26)
19	$ (253.06)	$ (2,571.26)
20	$ (376.81)	$ (5,941.38)
21	$ (376.81)	$ (5,941.38)
22	$ 31.64	$ 5,181.79
23	$ 277.28	$ 7,636.48
24	$ 341.66	$ 9,389.84
25	$ 109.84	$ 3,076.62
26	$ 109.84	$ 3,076.62
27	$ 109.84	$ 3,076.62
28	$ 109.84	$ 3,076.62
29	$ 109.84	$ 3,076.62
30	$ 291.46	$ 8,022.58
31	$ 291.46	$ 8,022.58
32	$ 291.46	$ 8,022.58
33	$ 291.46	$ 8,022.58
34	$ 291.46	$ 8,022.58
35	$ 268.86	$ 7,407.02
36	$ 268.86	$ 7,407.02
37	$ 268.86	$ 7,407.02
38	$ 268.86	$ 7,407.02
39	$ 268.86	$ 7,407.02
40	$ 363.01	$ 9,971.25
41	$ 363.01	$ 9,971.25
42	$ 363.01	$ 9,971.25
43	$ 363.01	$ 9,971.25
44	$ 363.01	$ 9,971.25
45	$ 504.42	$ 13,822.12
46	$ 539.83	$ 14,786.62
47	$ 539.83	$ 14,786.62
48	$ 539.83	$ 14,786.62
49	$ 539.83	$ 14,786.62
50	$ 557.02	$ 15,254.60
51	$ 557.02	$ 15,254.60
52	$ 557.02	$ 15,254.60
53	$ 557.02	$ 15,254.60
54	$ 557.02	$ 15,254.60
55	$ 511.83	$ 14,023.98
56	$ 511.83	$ 14,023.98
57	$ 511.83	$ 14,023.98
58	$ 511.83	$ 14,023.98
59	$ 511.83	$ 14,023.98
60	$ 478.00	$ 13,102.72
61	$ 478.00	$ 13,102.72
62	$ 478.00	$ 13,102.72
63	$ 478.00	$ 13,102.72
64	$ 478.00	$ 13,102.72
Total	$ 15,012.68	$ 429,874.06

Table A-D Five: Calculation of Incremental Income Tax For Single Year Cohort and Entire Degree Holder Groups

Bachelor Degree Holders - All Years:		
Annual Incremental Average Income Tax Contribution	$	2,706.16
Number of Bachelor Degree Holders		805,355.00
Percentage of Bachelor Degree Holders Earning Income Annually		0.9
Annual Total Incremental Tax Contribution - All Bachelor Degree Holders	$	1,961,479,467.91
Estimated Share of Federal Income Tax Transferred to Province of Ontario		0.4275
Estimated Additional Income Tax Revenues Flowing To Province of Ontario - Direct	$	**838,532,472.53**
Multiplier	$	**1.50**
Estimated Additional Tax Revenues Flowing To Province of Ontario - Direct and Indirect	$	**1,257,798,708.80**
Bachelor Degree Holders - One Year:		
Annual Average Provincial Income Tax Revenue to Province Per Bachelor Degree Holder		$1,041.20
Number of graduates each year entering labour force		54747
Estimated Additional Income Tax Revenues Flowing to Province of Ontario - Direct	$	**57,002,362.03**
Expenditure Multiplier		1.5
Estimated Additional Tax Revenues Flowing To Province of Ontario - Direct and Indirect	$	**85,503,543.05**
Estimated Additional Income Tax Revenues Flowing to Federal Government - Direct and Indirect	$	200,008,287.83
Masters and Doctorate Degree Holders - All Years:		
Annual Incremental Average Income Tax Contribution	$	3,030.90
Number of Masters and Doctoral Degree Holders		264,020.00
Percentage of Bachelor Degree Holders Employed		0.9
Annual Total Incremental Tax Contribution - All Masters and Doctoral Degree Holders	$	720,196,914.67
Estimated Share of Federal Income Tax Transferred to Province of Ontario		0.4275
Estimated Additional Income Tax Revenues Flowing To Province of Ontario	$	**307,884,181.02**
Multiplier	$	**1.50**
Estimated Additional Tax Revenues Flowing To Province of Ontario - Direct and Indirect	$	**461,826,271.53**
Masters and Doctorate Degree Holders - One Year:		
Annual Average Provincial Income Tax Revenue to Province Per Masters and Doctorate Degree Holder		$1,166.14
Number of graduates each year entering labour force		10597
	$	**12,357,581.49**
Expenditure Multiplier		1.5
Total Impact (direct and indirect)	$	**18,536,372.24**
Estimated Additional Income Tax Revenues Flowing To Federal Government - Direct and Indirect	$	43,359,935.07

Table A-D Six Calculation of Incremental PST and GST For Single Year Cohort and Entire Degree Holder Groups

Bachelor Degree Holders - All Years:		
Total Incremental Annual Sales Tax Per Graduate	$	341.20
Total Bachelor Degree Holders		805,355.00
Percentage of Bachelor Degree Holders Earning Income Annually		0.9
Total Incremental Sales Tax Per Year - All Graduates	$	247,306,443.79
Total Incremental PST Adjustment for exempt purchases		0.459
PST payments to Province - Direct (All Bachelor Degree Holders)	**$**	**247,306,443.79**
Multiplier	$	1.50
PST payments to Province - Direct and Indirect	**$**	**370,959,665.68**
GST Associated with Expenditures (Direct and Indirect)	$	707,167,118.68
Bachelor Degree Holders - One Year:		
Total Incremental Annual Sales Tax Per Graduate	$	341.20
Number of graduates each year entering labour force		54747
PST payments to Province - Direct (One Year Cohort)	**$**	**18,679,527.63**
Multiplier		1.5
PST payments to Province - Direct and Indirect (One Year Cohort)	**$**	**28,019,291.45**
GST Associated with Expenditures (Direct and Indirect)	$	53,413,681.95
Masters and Doctorate Degree Holders - All Years:		
Total Incremental Annual Sales Tax Per Graduate	$	382.14
Total Masters and Doctorate Degre Holders		264,020.00
Percentage of Bachelor Degree Holders Earning Income Annually		0.9
Total Incremental Expenditures Per Year - All Graduates	$	90,803,569.81
Multiplier		0.459
PST payments to Province - Direct (All Masters and Doctorate Degree Holders)	**$**	**7,264,285.58**
Multiplier	**$**	**1.50**
PST payments to Province - Direct and Indirect	**$**	**10,896,428.38**
GST Associated with Expenditures (Direct and Indirect)	$	20,772,058.45
Masters and Doctorate Degree Holders - One Year:		
Total Incremental Annual Sales Tax Per Graduate		$382.14
Number of graduates each year entering labour force		10597
PST payments to Province - Direct (One Year Cohort)	**$**	**4,049,547.72**
Multiplier		1.5
PST payments to Province - Direct and Indirect (One Year Cohort)	**$**	**6,074,321.57**
GST Associated with Expenditures (Direct and Indirect)	$	11,579,589.06
GST Associated With Expenditures - All Degrees, All Years	$	727,939,177.13
GST Associated With Expenditures - All Degrees, One Year	$	64,993,271.01
PST Associated With Expenditures - All Degrees, All Years	$	381,856,094.06
PST Associated With Expenditures - All Degrees, One Year	$	34,093,613.02

Table A-D Seven Calculation of Job Creation from Incremental Expenditures For Single Year Cohort and Entire Degree Holder Groups

Bachelor Degree Holders - All Years:	**Job Creation:**
Total Incrementai Annual Expenditures Per Graduate (After Taxes)	$ 6,838.91
Total Bachelor Degree Holders	805,355.00
Percentage of Bachelor Degree Holders Earning Income Annually	0.9
Total Incremental Annual Expenditures - All Bachelor Degree Holders	$ 4,956,972,062.57
Total Jobs Created - Direct and Indirect (All Bachelor Degree Holders)	**123,924.30**
Multiplier used to allocate between direct (1.0) and indirect (0.5)	1.50
Total Jobs Created - Direct (All Bachelor Degree Holders)	82,616.20
Total Jobs Created - Indirect (All Bachelor Degree Holders)	41,308.10
Bachelor Degree Holders - One Year:	
Total Incremental Annual Expenditures Per Graduate (After Taxes)	$ 6,838.91
Number of graduates each year entering labour force	54747
Total Incremental Annual Expenditures - One Year Cohort (Bachelor Degree)	$ 374,409,559.22
Total Jobs Created - Direct and Indirect (One Year Cohort of Bachelor Degree Holders)	**9,360.24**
Multiplier used to allocate between direct (1.0) and indirect (0.5)	1.50
Total Jobs Created - Direct (One Year Cohort of Bachelor Degree Holders)	6,240.16
Total Jobs Created - Indirect (One Year Cohort of Bachelor Degree Holders)	3,120.08
Masters and Doctorate Degree Holders - All Years:	
Total Incremental Annual Expenditures Per Graduate (After Taxes)	$ 7,659.57
Total Masters and Doctorate Degree Holders	264,020.00
Percentage of Masters and Doctorate Degree Holders Earning Income Annually	0.9
Total Incremental Annual Expenditures - All Masters and Doctorate Degree Holders	$ 1,820,052,691.84
Total Jobs Created - Direct and Indirect (All Masters and Doctorate Degree Holders)	**45,501.32**
Multiplier used to allocate between direct (1.0) and indirect (0.5)	1.50
Total Jobs Created - Direct (All Masters and Doctorate Degree Holders)	30,334.21
Total Jobs Created - Indirect (All Masters and Doctorate Degree Holders)	15,167.11
Masters and Doctorate Degree Holders - One Year:	
Total Incremental Annual Expenditures Per Graduate (After Taxes)	$ 7,659.57
Number of graduates each year entering labour force	10597
Total Incremental Annual Expenditures - One Year Cohort (Masters and Doctorate Degree)	$ 81,168,507.33
Total Jobs Created - Direct and Indirect (One Year Cohort of Masters and Doctorate Degree Holders)	**2,029.21**
Multiplier used to allocate between direct (1.0) and indirect (0.5)	1.50
Total Jobs Created - Direct (One Year Cohort of Masters and Doctorate Degree Holders)	1,352.81
Total Jobs Created - Indirect (One Year Cohort of Masters and Doctorate Degree Holders)	676.40

Table A-E-One: Philanthropic Premium Due To Higher Earnings of University Degree Holders (1998)

Average Donations Per Year ($)	**1997**	**1998**					
University Graduate	$ 531.00	535.779					
High School Graduate	$ 239.00	241.151					
Incremental Donation	$ 292.00	294.628					
Calculation of Donor Numbers:							
Total Donors	7,250,485						
Percentage - university graduates	16.3						
Donors - university graduates	1,181,829						
Philanthropic Premium Calculation: (Based on 1997 Ontario Population Aged 15 Years and Older)							
Total Number of Individuals Holding University Degrees							1,277,140.00
Individuals Holding University Degrees - 1998							1,342,029.00
Average Annual Donation From Each Donating Holder of A University Degree							$ 535.78
Total Donations From University Degree Holders Each Year							$ 674,077,140.25
Average Annual Donation From Each Holder of a High School Diploma							$ 241.15
Total Donations If UD Holders Contributed As Do HSD Holders							$ 253,931,090.07
Additional Donations Difference Related to Difference in Educational Attainment (Annual)							**$ 420,146,050.18**
(takes into account both the increased participation rate and the increased average donation)							

Table A-E-Two: Volunteerism Premium Due To University Degree Holder Contributions

Volunteerism Premium Calculation: (Based on 1997 Ontario Population Aged 15 Years and Older)	
Total Number of Individuals Holding University Degrees	1,277,140.00
Individuals Holding University Degrees - 1998	1,342,029.00
Average Number of Hours of Volunteer Time Per Holder of A University Degree	139.00
Total Number of Hours of Volunteer Time Contributed By University Degree Holders Each Year	86,986,005.40
Average Number of Hours of Volunteer Time Per Holder of a High School Diploma	177.00
Total Number of Hours of Volunteer Time If UD Holders Contributed As Do HSD Holders	65,555,596.20
Additional Volunteer Hours Related to Difference in Educational Attainment (Annual)	21,430,409.20
Hourly Rate As Minimum Wage for Ontario	$ 6.85
Volunteerism Premium:	**$ 146,798,303.02**
(takes into account both the increased participation rate and the reduced average hours of volunteer time)	